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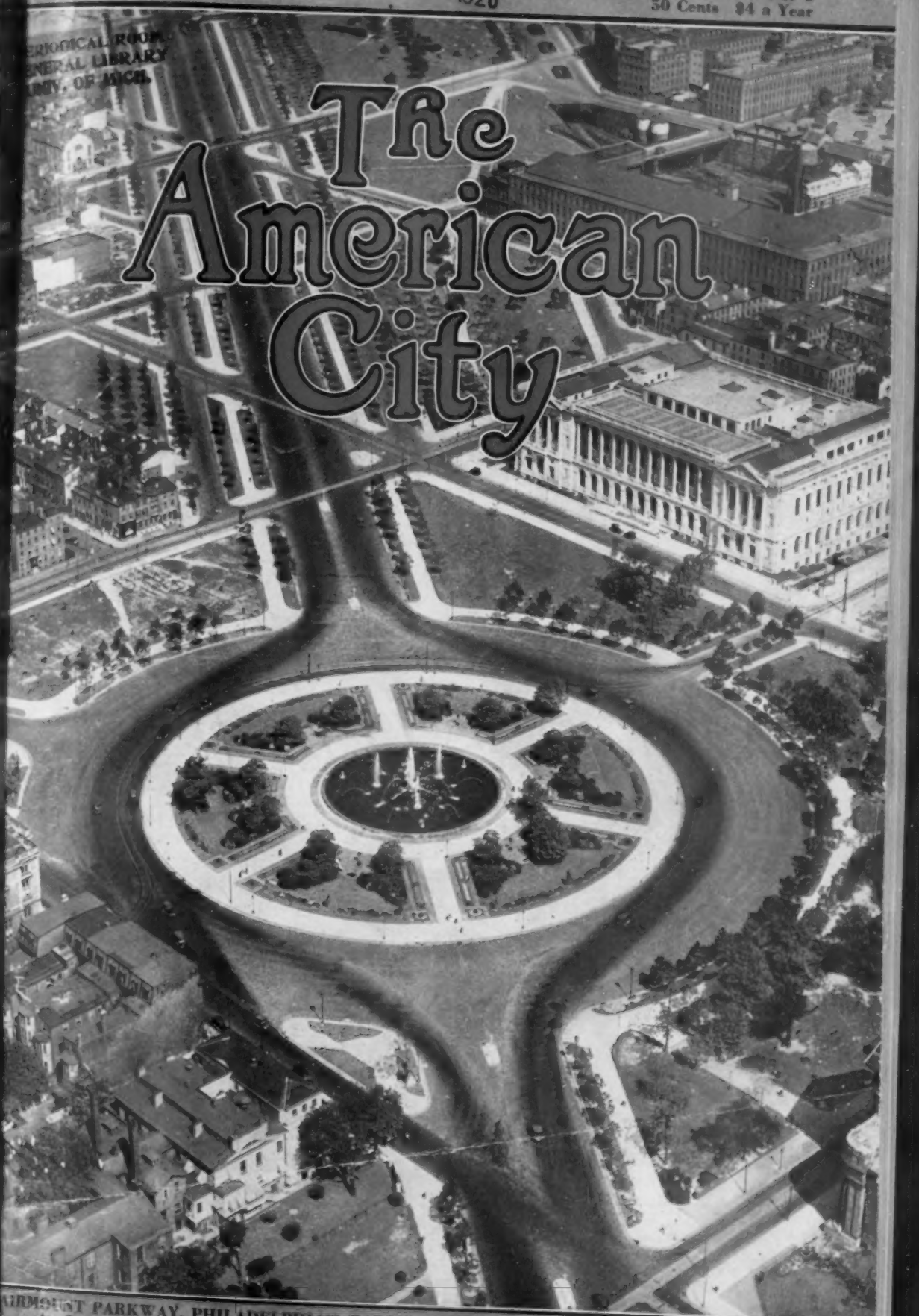

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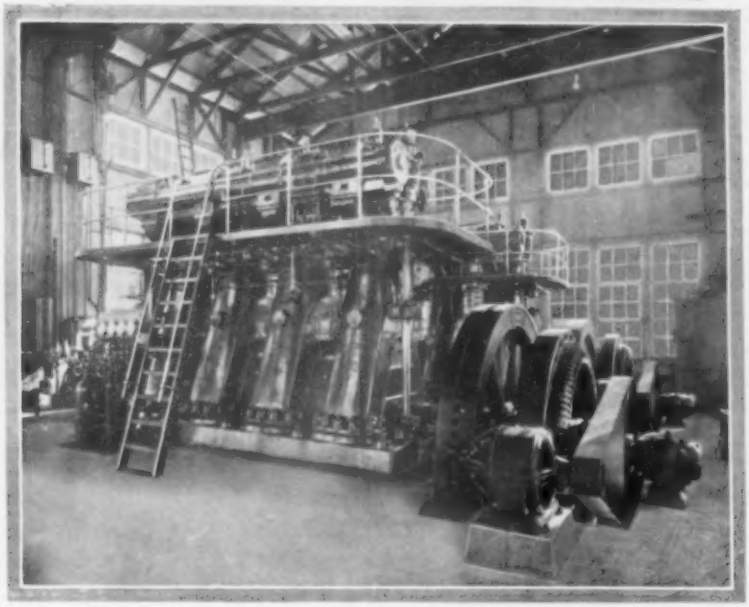
An Outstanding City Planning Achievement Which Municipal Officials Visiting

FULTON DIESEL



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"During the last six years of its life the old steam plant had shown an average annual *loss* equal to about 30 per cent of the yearly tax income of the City; during the first year the new plant has shown a *profit* equal to about 150 per cent of the yearly tax income of the City."

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VOL. XXXV. No. 1 THE AMERICAN CITY, July, 1926 Price, 50 Cents; $4 a Year

Entered as second-class matter, April 16, 1923, at the Post Office at New York, N. Y., under Act of March 3, 1879

Issued Monthly by The Civic Press, 443 Fourth Ave., New York. Printed in U. S. A.

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July-December, 1926

The American City Magazine

Publication Office, 443 Fourth Avenue, New York

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on the subjects listed in the foregoing pages and on other subjects relating to municipal improvements and civic advance, see the annual volumes of THE AMERICAN CITY's yearbook,

The Municipal Index

Vol. XXXV
No. 1

The American City Magazine

JULY
1926

443 Fourth Avenue
New York

50 Cents
$4 a Year

Appraisal of Public Health Service in Fifteen Illinois Cities

EFFECTIVE use has been made, by the State Department of Public Health of Illinois, of the Appraisal Form for City Health Work prepared by the Committee on Administrative Practice of the American Public Health Association.

The Civil Administrative Code of Illinois requires the State Department of Public Health "to keep informed of the work of local health officers and agencies throughout the state," and "to supervise, aid, direct and assist local health authorities or agencies in the administration of the health laws."

It was desired to meet these requirements in a systematic way and to collect information concerning all phases of health service in such a manner that comparisons between different cities would be possible. It was also desired to determine the applicability of the standard Appraisal Form to conditions in Illinois, and to learn whether or not this method of numerical appraisal would furnish a more accurate picture of health conditions in a city than is possible through the use of uncorrected disease and death rates.

The reasons for undertaking the survey, and the results secured, are outlined in a report of more than 100 pages in the May-June issue of *Illinois Health News*.* A few excerpts follow:

"When this summary was undertaken, the Department planned, if this appraisal method proved satisfactory, to bring to the attention of city governments, health officers, the medical profession, commercial interests and volunteer health agencies, the facts as to the actual and comparative standing of each health activity in these cities, in the belief that they would serve as a stimulus to meeting shortcomings in local health programs and in pointing out activities in which the different cities excel. Along with these facts, recommendations were to be made for improvements in the nature or extent of health service, where such improvements are indicated.

"It has been a matter of common knowledge that there is a great diversity of policy and procedure in different cities in attacking the same health problem. Surely there must exist some best way, in the light of present knowledge, of solving a given problem, and it would be of very distinct advantage to these and other cities for this 'best way' to be pointed out to them.

A Method of Scoring Health Activities

The Appraisal Form referred to in the accompanying article seeks to measure the status of health in a city by applying a numerical score. Values are assigned to all usual health activities; each of the forty-six items of health service is scored. These scores are divided into eight sections representing groups of activities, such as vital statistics; communicable disease control; venereal disease control; tuberculosis control; health of the child; sanitation; food and milk control; water and sewerage. The total score for all health services in a city equals 1,000 points. The scores in general are based on character and extent of the health service rendered, regardless of whether it is done by an official or voluntary agency.

As previously mentioned in The American City, the complete Appraisal Form is available, in a 68-page pamphlet, at 50 cents, from the American Public Health Association, 370 Seventh Avenue, New York.

* A copy of this issue of *Illinois Health News* will be sent by the State Department of Health, Springfield, Ill., to any health officer, or state or municipal official requesting it.

"If the standard method of appraisal furnishes an accurate picture of health service in a city, this survey would serve as a base line from which progress in future years can be measured. In any event, the intimate knowledge of the health problems in these cities gained by this survey, should be of advantage to the State Department of Public Health in enabling it to render more definite and accurate advice and assistance.

"Does the appraisal form give a true picture of conditions in these Illinois cities? In any method of appraisal of a group of activities so diverse as those embraced under the term 'public health service' it is to be expected that slight errors and inconsistencies will be found. Some of these can be eliminated by changes which necessarily will be made in the light of experience.

"In general, however, it may be stated that *this method of approval does furnish an accurate picture of the health service in this group of cities.* The five cities which stand at the top of the list in this method of appraisal would be placed at the top of the list by any other method of study and observation of their health services. Likewise, the cities which stand at the bottom of the list would be placed there by any health survey which considered comparative standards. The 'standards' set in this score system are not too high, since in some one or more of these fifteen cities a perfect score was attained for practically every one of the forty-six items which make up the total. Judged from the standpoint of expenditures this method of appraisal likewise is applicable. The five cities spending the most for their health service are among the first six at the top of the list in the total score attained; the five cities at the bottom of the list from the standpoint of expenditures are among the lowest six when their scores for health service were computed.

"It is believed that this method of scoring will stimulate rather than hamper initiative, and will not delay the institution of improved methods, or prevent continued research into many unsolved problems. The great need is to bring all phases of health service in all cities to the same degree of excellence as is now attained in some; and thereby to secure the more general application of the existing knowledge of medical science for the prevention of disease and promotion of health. In Illinois this method of appraisal has, we believe, served already and will continue to serve as a means of accomplishing this end.

"Possible disadvantages of this method of appraisal should be considered. Health officers may work 'to attain a good score' rather than to do their work more thoroughly; they may disregard local problems which are important because little credit is given in this appraisal; and they may neglect some existing activity because 'it is now up to standard.'

"If these disadvantages become apparent, however, they can be minimized by changes and improvements in the method of appraisal. The health officer who is sufficiently competent to bring the score for health service in his city to a creditable standard, as viewed by this appraisal, probably will exercise good judgment in planning his program to meet local needs, and in conducting his work in an efficient manner.

"In interpreting and applying the statements made in the body of this report the various items mentioned above should be considered, and the facts and conclusions stated should be balanced against more intimate knowledge of local conditions.

Some Summaries and Recommendations by the State Department of Public Health of Illinois

"If every city in this group had attained the same degree of excellence for all of its health work as is attained in some phases of health service in some of these cities, their public health obligations would be largely fulfilled. Such, however, is not the case. The average score for all health activities is 56.3 per cent, which is only approximately one-half of what these cities can reasonably be expected to do in the conservation and protection of the health of their citizens.

WIDE VARIATION IN EXPENDITURES

"Money invested in public health service pays handsome dividends. The results of health service bear a very direct relationship to the amount of money available for health activities. Per capita expenditures through the local health departments vary from 8½ cents in Moline to 61 cents in Evanston, with an average of 28 cents for the group. Expenditures by all agencies for health activities vary from 36 cents per capita in Danville and Moline to $1 in Evanston, the average being 59 cents. Public health, like any other business, cannot be operated satisfactorily without adequate funds for its support. Present expenditures in many cities are inadequate for the demands of the minimum necessary health program.

BANEFUL EFFECTS OF PARTISAN POLITICS

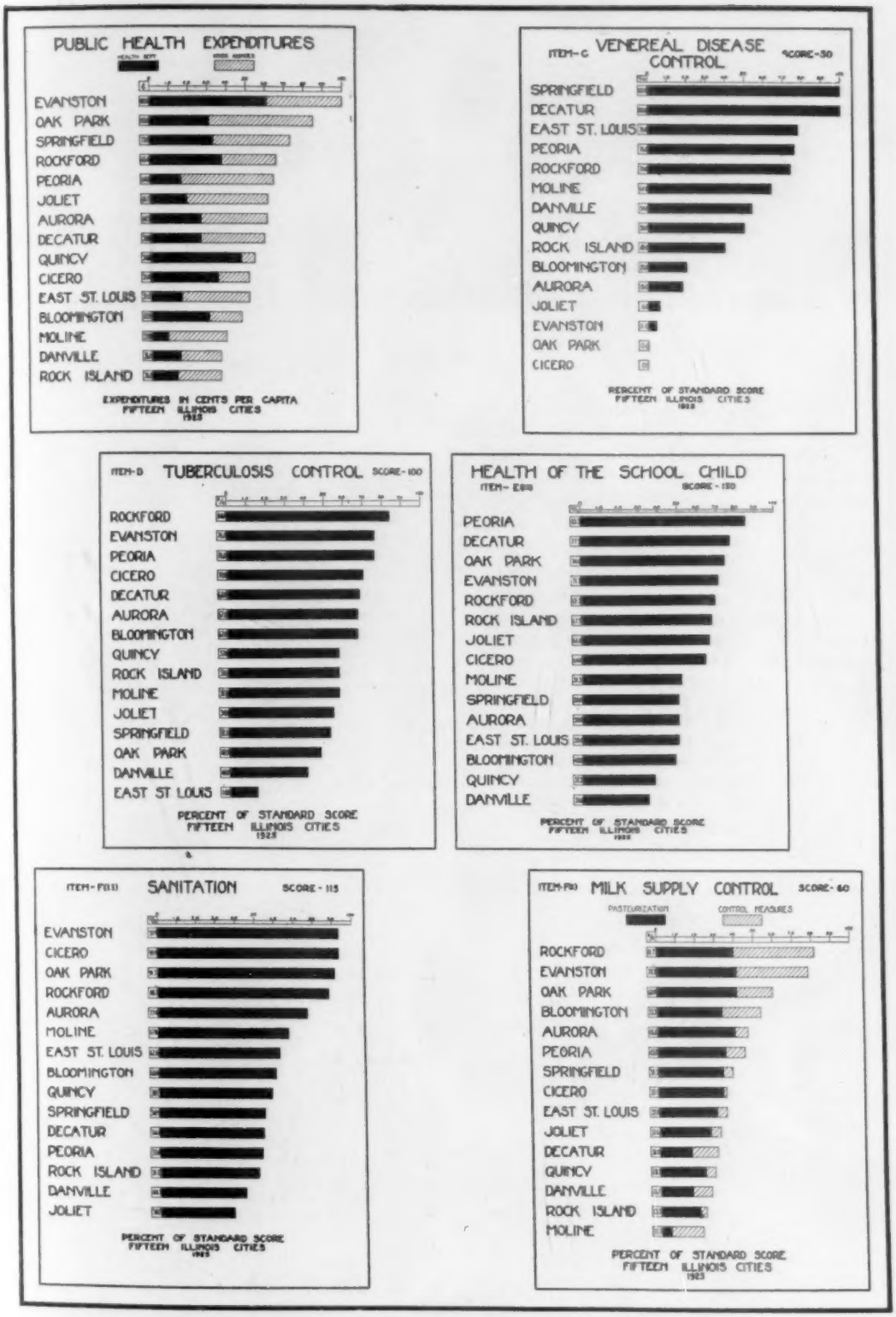
"The greatest handicap to municipal public health work in Illinois arises from the baneful influence of local partisan politics. The cities standing at the top of the list, as shown by this survey, have placed their health departments on a scientific rather than a political basis. City health departments should be taken out of politics and placed on the basis of efficient service, if material health progress is to be made.

NEED FOR MORE FULL-TIME HEALTH OFFICERS

"Four of the fifteen cities employ a health officer who devotes his entire time to the duties of his office—Decatur, Springfield, Bloomington, and Quincy. In the fifth, Rockford, the health officer gives practically full-time service. In most of the other cities, the health officers are paid a meager salary and devote a relatively small amount of time to their position. Only in a few of the cities has the health department itself assumed its proper position of leadership in directing or coordinating the work of all health agencies in the city. In only four cities is there a definite plan for the complete coordination of all public health activities. Each city in this group is large enough to necessitate full-time service of the health officer, and health departments should take the initiative in bringing about a definite coordination of all municipal health activities.

ATTITUDE OF LOCAL DOCTORS AND DENTISTS

"In general, the status of health service in these cities reflects accurately the extent or lack of sympathetic interest shown in the past by the local medical profession in community health problems. The same is true concerning oral hygiene



SIX OF THE TWENTY-SIX CHARTS USED IN THE APPRAISAL OF PUBLIC HEALTH SERVICE IN FIFTEEN CITIES BY THE ILLINOIS DEPARTMENT OF PUBLIC HEALTH

and the dental profession.

"There has been the apparent absence of a state-wide policy on the part of the medical profession concerning many phases of public health work. On some questions the attitude of physicians in one city was found to be directly opposite to that found in another. A more active and sympathetic interest on the part of local medical societies is needed in sponsoring and guiding community health programs. Such an interest will result in harmonious progress which will promote the mutual welfare of both the public and of the profession.

BETTER COORDINATION NEEDED

"A remarkable and unnecessary lack of uniformity was found to exist in the prevailing methods of attacking the same health problems in the different cities. No less diversity was apparent in the emphasis given by different cities to corresponding phases of their health problems. Better coordination of health activities now being carried out by various organizations in each city is much needed. The State Department of Public Health should take the initiative in outlining approved methods for conducting all phases of city health work.

The Lowest Bidder and the Surety Bond

COMMENTS have been received from three city managers on the editorial published in the April issue of this magazine, in which the question was raised as to whether sound public policy requires a surety bond on every public works contract, and compulsory letting of the contract to the lowest bidder who can secure such a bond. These letters follow:

From C. M. Osborn, City Manager, Kenosha, Wis.:

I agree with your article that some change should be made in the matter of surety on a contract. Our Wisconsin law provides that on public works contracts the contractor must furnish a surety company bond in the full amount of the contract price and in addition to that the city must retain 20 per cent of all estimates until the job is completed. This is more surety than is necessary. There is no relief in our case except to convince the State Legislature that the law should be changed.

I believe the article in the April issue of THE AMERICAN CITY MAGAZINE is a fair one and that concerted effort should be made by municipalities so they could be in a position to require a fair amount of surety and not have to require more than is necessary.

From Earl C. Elliott, City Manager, Wichita, Kans.:

Every city is confronted with the menace of the irresponsible and inefficient bidder. One of the most difficult problems connected with the handling of public contracts is presented by the situation which so frequently arises when the lowest bidder is the poorest bidder.

The American public has been educated to the idea that in awarding all public contracts the question of the bid should be paramount, and the question of the bidder should have but secondary consideration. As a result, the public officials who have the courage to award contracts to the lowest and *best* bidders subject themselves often to severe and unmerited criticism.

To relieve this pressure upon public officials, and to properly safeguard the public interest in public contracting, something, of course, should be done. We, here in our city, favor an adequate fidelity bond, underwritten by a responsible surety company, to safeguard the city's interest. We expect the surety company to discriminate in the matter of the applicant for bond. In our judgment a personal bond should never be accepted for public work.

It is true that occasionally public work is delayed by the inability of a contractor to complete the contract under the bid and by the attendant necessity of looking to the surety company. But we believe that we should be confronted by the same situation if cash were withheld when making settlement with contractors. In that event the city would have to go ahead and complete the job itself or readvertise, and we should not have as adequate a guarantee against the irresponsible bidder as we have through the surety company.

Of course the public pays the bond fee, indirectly, but that is a small item, and in competitive bidding one that is very frequently absorbed by the bidder.

It seems to us, then, that the safest method of handling the situation which arises in open bidding for public work, is to require a surety bond in a minimum amount equal to the figure of the bid, and for the surety companies, in turn, to carefully scrutinize the individuals or firms whose fidelity and skill they guarantee. This takes a great burden off the shoulders of the city officials who have the awarding of contracts, and at the same time safeguards the public interest.

From J. P. Jervey, City Manager, Portsmouth, Va.:

I agree with you that the requirement of a surety bond does not always give sufficient protection, but it is an advance on personal bonds, which are often accepted. We have found that the requirement of a certified check of a reasonable amount keeps out many undesirable bidders, and I believe a cash deposit of 2 per cent of the contract price on the signing of the contract would have a similar tendency.

In all of our contracts, in addition to the certified check required with the bid, we require a surety bond of 50 per cent of the amount of the contract and retain 15 per cent on each estimate until the final completion of the contract. This would be in line with the thought expressed in the article referred to.

FRONT VIEW OF WATER-SOFTENING PLANT DURING CONSTRUCTION, MIAMI, FLA.

Features of the Miami Water-Softening Plant

By L. R. Howson

Alvord, Burdick & Howson, Engineers, Chicago

THE rapid growth of Miami has imposed demands upon the water system which it has been unable to meet satisfactorily. Sometime prior to 1923 the supply of water from the wells, which were drilled in relatively close proximity to the ocean, became increasingly "brackish," and, as it was already high in color and very hard, a new supply was sought. Ernest Cotton, Director of Public Service of the city of Miami, made an extensive study of the local water-supply situation, and as a result of his investigations the development of a new supply near Hialeah, some seven miles west of the main portion of Miami, was decided upon. The cost of developing this supply, softening it and delivering it to the city's distribution system, was greater than the privately owned water company cared to assume, and as a result the city voted a bond issue, made the improvements, and is delivering the water to storage reservoirs within the city, from which the private company is distributing it to the consumers.

Character of Water-Supply

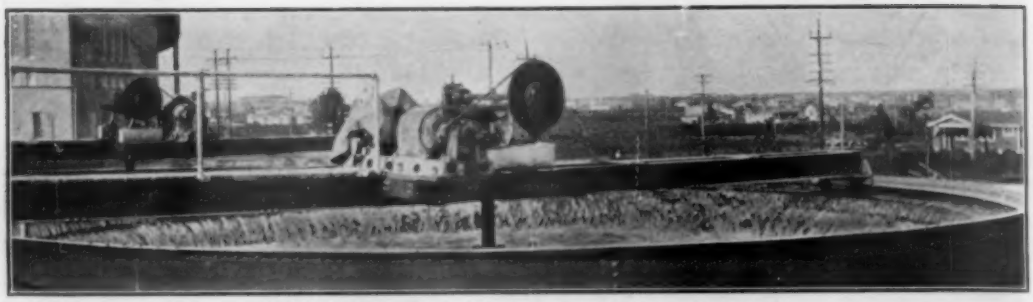
The new water-supply is drawn from a series of 14-inch wells drilled from 60 to 90 feet deep into the Miami limestone, which is highly water-bearing. The writer tested one well which showed a delivery of 4,000 gallons per minute with a lowering of the water-level of less than 10 feet, giving a specific capacity of over 400.

The water has a total hardness of approximately 300 parts per million, of which all but approximately 45 parts per million is temporary or carbonate hardness. The color ranges from 20 to 60 parts per million.

Type of Treatment

The hardness being largely temporary, it was decided to utilize a lime softening treatment only, supplemented by a small dosage of

DETAIL OF SUPERSTRUCTURE, SHOWING ARCHWAY FROM OPERATING GALLERY TO LABORATORY, OFFICE AND PUMP-ROOM



MIXING TANKS, SHOWING AERATION EFFECTED

alum to speed up the settling process.

The softening plant as laid out in June, 1924, consisted of the chemical house with equipment, mixing tanks, Dorr clarifier, sedimentation basin, settling basin, carbonating basin, a 10-million-gallon rapid sand filtration plant and electric pumping equipment having a total capacity of 40 million gallons per day in three units. This part of the plant was completed in the summer of 1925. In September, 1925, it was decided to increase the capacity to 20 million gallons per day. This construction is now practically completed.

The Chemical House

The chemical house is 29 by 42 feet in plan. It houses the lime storage tanks and all chemical feeding equipment.

The lime is received at the plant either by truck or by carload, in the latter case provision being made to unload by a power scoop. The lime drops into a hopper, from which it is lifted by a bucket elevator to the top of two steel storage tanks, each holding approximately 5,000 cubic feet of lime.

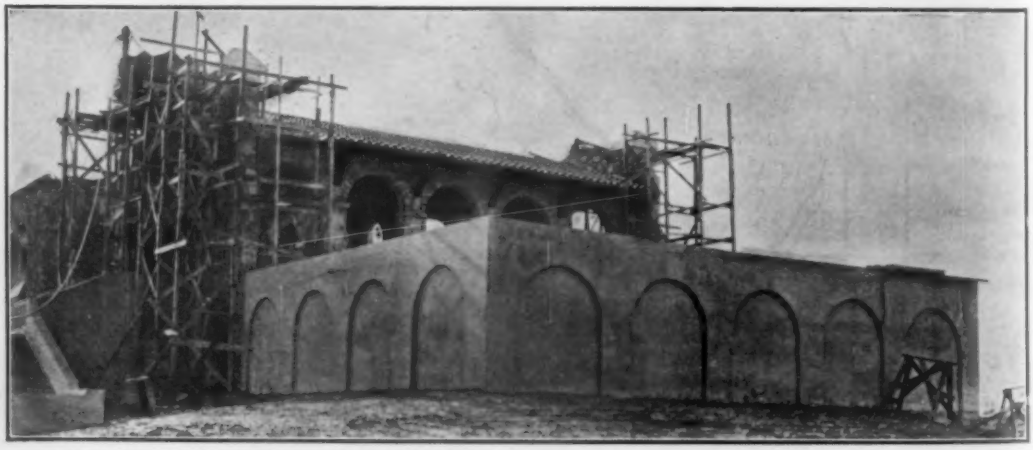
From the tanks the lime drops through weighing devices each having a capacity of 2,000 pounds, thence through a measuring device to slakers, and thence into solution tanks which are located on the first floor of the chemical house. Each solution tank has a liquid capacity of 3,600 gallons, and the practice is to dissolve 5,000 pounds of lime per charge.

All equipment is in duplicate and capable of handling the chemicals necessary to treat up to 35 million gallons per day with but slight adjustment.

The lime solution tanks are mechanically agitated. The solution is pumped to the mixing tanks, the rate of pumpage being governed by a proportional feeding device, Venturi meter controlled.

The Mixing Tanks

The two circular steel mixing tanks are each 30 feet in diameter by 22 feet in height, and are mechanically agitated by revolving panels. On entering the mixing tanks and prior to the feeding of the lime, the water falls over an annular weir and splash plate for the removal of CO_2.



EAST VIEW OF MIAMI FILTRATION PLANT, SHOWING FILTERS AND OPERATING GALLERIES

Clarifier Basin

From the mixing tanks the water flows to a clarifier basin providing one hour's detention at a 10-million-gallon rate. This basin is provided with a Dorr clarifier mechanism and a Dorr pump for the removal of sludge.

A second clarifier basin is now under construction. This basin is 110 feet square and, in conjunction with the present basin, will provide settling capacity for 50 million gallons of water per day.

Settling Basins

In the original design a settling basin with two hours' detention followed the clarifier basin. The first year's operation has demonstrated that this capacity, as the plant grows, may best be utilized by converting it into additional carbonating basins. The clarifiers are removing so much of the sludge that secondary sedimentation is not important.

Carbonating Basin Equipment

The carbonating basin provides one hour's detention at a 10-million-gallon rate, or 30 minutes at a 20-million-gallon rate. This basin is provided with a grillage of small perforated pipes, through which CO_2 gas is pumped from the generator. CO_2 in this case is generated through the combustion of oil, about 1/3-gallon of oil per hour being required for each million gallons treated. The oil carbonating equipment is operating very satisfactorily.

Filters

The first filter installation consisted of four mechanical filter beds, each designed for 2½ million gallons per day when operated at the usual water-works rating of 2 gallons per square foot per minute. In practice, with the excellent quality of applied water, it has been found practicable to operate continuously at rates approximately 50 per cent in excess of the standard rating.

Four sand beds are now being added, making the total capacity of the eight beds 20 million gallons per day at water-works rating.

Clear Well

From the filters the water drops to a clear well vertically underneath. From the clear well the water is pumped to the city and delivered to the water company.

Quality of Softened Water

The water after treatment has zero color and turbidity and a total hardness of approximately 90 p.p.m., of which one-half is temporary and one-half permanent hardness.

Superstructure

The superstructure is of Spanish design, built of rock secured from the excavation for the structures and for the pipe line. This rock has a beautiful texture, colors beautifully on exposure, and also hardens under exposure.

Method of Executing Work

Because of the urgent need of a better water-supply at the earliest possible moment, and the difficulty experienced by contractors in getting equipment and materials for construction purposes, due to freight embargoes, it was decided to construct all of this work by day labor under the city's forces. This work has been done very expeditiously and economically in this manner. Ernest Cotton, Director of Public Service, has been in general charge, the detailed construction being under the direction of James Cox, Engineer of the Water Division.

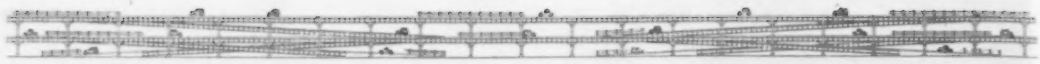
The plans and specifications for the work were prepared by Alvord, Burdick & Howson, consulting engineers, Chicago. Charles P. Hoover assisted the engineers on the chemical features. Victor A. Matteson was architect on the design of the superstructure.

Philadelphia's Parking-Riding Plan Extended

The "parking-riding" plan instituted last fall by the Philadelphia Rapid Transit Company has recently been extended by the opening of a third parking area for private automobiles. Under the Philadelphia plan, as outlined in the *Electric Railway Journal*, a prospective passenger on the lines of the Rapid Transit Company, on driving his car to one of these areas, pays a parking fee and receives without further charge two car tickets which entitle him to ride into the city and back to the parking area.

The first two areas opened are located in outlying territories at opposite ends of the elevated-subway lines. At both of these the charge is 25 cents per car, including two transportation tickets. One of these areas is capable of accommodating 500 cars, and the other 250. At the third area, a charge of 35 cents is made because of the higher cost of leasing the land. This plot accommodates 100 cars.

The Rapid Transit Company plans to extend these parking areas in a ring around the central business district of Philadelphia, in order to induce people to use the P.R.T. cars in the center of the city and thus reduce the congestion which has been steadily increasing in the downtown area.



SIDE ELEVATION AT RAMPS IF SECOND DECK ADDED, MAKING THREE-LEVEL STRUCTURE

New York to Have a $13,500,000 Elevated Express Highway

Four-Mile Marginal Thoroughfare to Be Financed Entirely by Assessments on Property Owners in the Borough of Manhattan

APPROVAL was given, at a meeting of the Board of Estimate and Apportionment of the City of New York, on June 17, of the general terms of a proposal submitted by Julius Miller, President of the Borough of Manhattan, to construct an elevated express highway adjacent to the Hudson River, extending from the mouth of the new vehicular tunnel at Canal Street to the beginning of Riverside Drive at 72d Street.

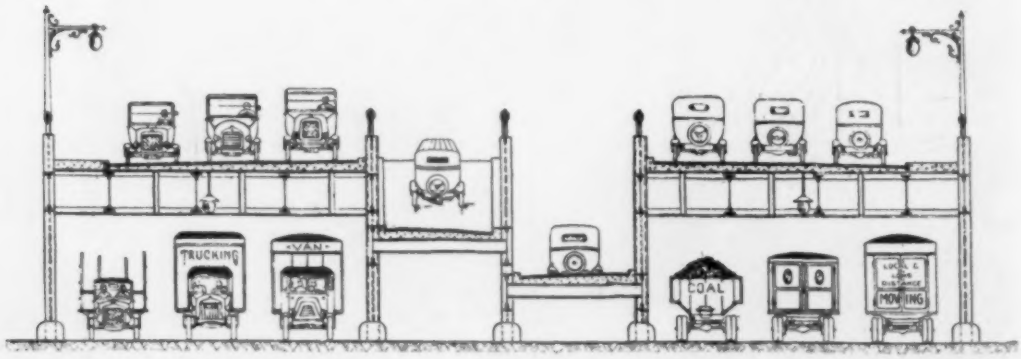
The favorable action was based on the recommendations of the Borough President and on a report from Arthur S. Tuttle, Chief Engineer of the Board of Estimate and Apportionment, dated May 18, 1926, from which the following excerpts are taken:

"The plan now submitted provides for consructing an elevated express highway on a structure 70 feet in width generally within the lines of West street, 11th avenue, 13th avenue and 12th avenue, except where these avenues adjoin a city-owned marginal way, in which case the center line of the structure is located over the dividing line between the avenue and the marginal street. No grades are established for the elevated roadway, which is indicated as having a width of 60 feet, but the Borough President's communication, and the sections forming a part of the plan, indicate a minimum clearance below the structure of 14 feet, which would require an elevation of roadway of not less than 19 feet above the present street surface. The plan indicates that ramps connecting with the street surface, having grades of about 5 per cent, are to be provided in the vicinity of Canal street, Christopher street, West 14th street, West 23d street, West 34th street, West 42d street and West 57th street, at which points the structure is widened to 100 feet in order to accommodate six lines of through traffic, which is equivalent to the capacity of the roadway in the intervening sections between the ramps. The proposed arrangement of the ramps is ingenious and well adapted to bring about the complete separation of conflicting traffic currents. The total length of the structure will be approximately four miles.

Approval of Civic-Commercial Organizations

"Since the submission of the plan, the project has received the enthusiastic endorsement of the Broadway Association, Inc.; the Fifth Avenue Association, Inc.; the Merchants' Association of New York; the Thirty-fourth Street-Midtown Association, Inc.; the Bronx Board of Trade; the Washington Square Association; the Central Mercantile Association, and the New York Board of Trade and Transportation.

"The Fifth Avenue Association states that the approval of the plan is contingent upon a relocation of the proposed ramps so as to effect the distribution of traffic through crosstown streets which are not so congested as are the streets which have been selected, and recommends that several crosstown vehicular tunnels be constructed to facilitate access to the elevated street and reduce the burden of crosstown vehicular movement. The Mer-



CROSS-SECTION AT RAMPS OF PROPOSED SINGLE-DECK (TWO-LEVEL) STRUCTURE

chants' Association recommends the approval and authorization of the project as part of a plan to provide elevated vehicular roadways for by-passing traffic along the Hudson and East River waterfronts from the lower to the upper part of Manhattan, which was advocated by their Committee on Control of Street Traffic in a report published in February, 1924.

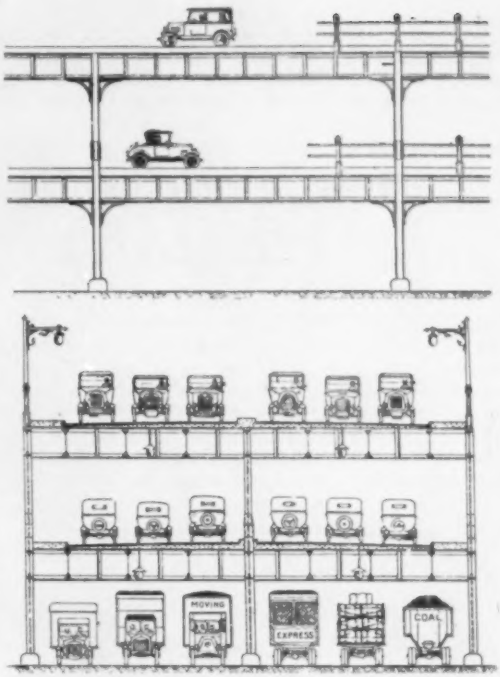
Combined Water-Front Highway and Marginal Way

"Among the various plans heretofore discussed for increasing or supplementing the limited traffic capacity of the longitudinal highways in the Borough of Manhattan, that involving the construction of an elevated street along the North River waterfront has been frequently advocated. The favor with which this suggestion has been generally received, in contrast to the objections which have been raised against the construction of similar facilities along other thoroughfares or through private property in the center of the island, must be ascribed to the fact that the unusual width and position of the combined water-front streets and marginal way makes this area particularly adaptable for an improvement of this character, without detracting, to any great extent, from the usefulness of the property acquired and reserved for commercial purposes in connection with port activities, or causing damage to abutting property in private ownership. It also seems reasonable to assume that the relief afforded to heavy trucking traffic which must use the surface street, through the removal of the bulk of the light traffic from the surface to the elevated highway, will more than compensate for the relatively slight encroachment of the proposed structure upon the marginal area.

"Hitherto all of the projects looking to the improvement and clearing up of the intolerable conditions along the North River water-front have been complicated by an incidental attempt to make provision for the freight service of the New York Central Railroad between its West 60th street freight yard and the St. John's Park terminal south of Canal street, which is now operated upon the street surface of 11th avenue, 10th avenue, West street, Canal street, Hudson street and a number of the crosstown streets in the vicinity of the West 30th Street Railroad Yard. The Borough President states that the present plan relates only to the construction of a highway, the New York Central Railroad Company having devised another plan for removing its tracks from the surface of these streets, the carrying out of which, I am informed, will not conflict in any way with the improvement now proposed, provided sufficient clearance is established under the highway where it crosses the West 60th Street Yard to permit of projected changes in the railroad facilities and interference is avoided at other points with such tracks as it is necessary for the railroad company to maintain.

Another Deck May Be Added, Making a Three-Level Highway

"A conservative estimate of the traffic capacity of the six-lane roadway planned by the Borough President indicates that this roadway will have a maximum hourly capacity of about 9,000 vehicles, if limited to light passenger traffic operated at



SIDE ELEVATION AND CROSS-SECTION BETWEEN RAMPS IF SECOND DECK ADDED, MAKING THREE-LEVEL STRUCTURE

speeds of from 20 to 30 miles per hour, at which speeds the time required to travel between Canal street and West 72d street will vary from 8 to 12 minutes, and the total number of vehicles on the four-mile viaduct which could be accommodated at any one time will number between 1,200 and 1,800. While a roadway of this capacity may appear adequate for the requirements, I am firmly convinced that within a very short period after its completion the proposed structure would be over-crowded and its efficiency seriously crippled by reason of the necessity of sacrificing speed to provide for an excessive volume of traffic. The spacing and arrangement of the columns as shown on the plan submitted by the Borough President, and the location assigned to the structure, are also such that the surface street could not be utilized to the best advantage and would result in serious traffic congestion in certain localities and make it generally difficult, if not impossible, to route surface traffic so as to avoid interference.

"The present inadequacy of the street system of Manhattan should serve as a forceful reminder that in planning for the future it is practically impossible to provide facilities which will not sooner or later be found insufficient to meet the needs. With this thought in mind, your engineer has made an extended study of methods for ultimately increasing the capacity of the elevated highway, but under the assumption that the Board would probably not feel justified in authorizing at this time a roadway of greater capacity than that now proposed by the Borough President. These studies have brought out the impracticability of at some future date widening the structure planned by the Borough President or of otherwise increasing its capacity, except by methods involv-

ing extensive alterations for which the cost would be excessive. Any such widening would also mean the sacrifice of a greater portion of the street surface and marginal way than would appear justifiable. A plan has accordingly been evolved whereby the capacity of the elevated structure can be doubled, when occasion arises, by the addition of an upper or second deck, without in any way interfering with the use of the original roadway or ramps during, or after, construction, and which will provide for a more efficient use of the surface highway. This modification will increase the initial cost of the structure only to the extent required to provide for the heavier supporting columns and column foundations necessary to carry the greater weight of the superstructure, and for the heavier girders which would have to be used on account of the increase in transverse column spacing to permit of the construction of the upper deck and to make a more economical use of the street surface. The upper deck, when constructed, would be connected with the street surface by extending two of the original ramps to this deck, and the traffic would be rerouted so that the use of the lower and upper decks would be limited to northbound and southbound traffic respectively. In general, the elevation of the upper deck would be about 40 feet above the street surface. Another advantage of the double deck type of viaduct is its adaptability to the construction of additional approaches to meet unforeseen future requirements by means of ramps located alongside of the structure or diverging through private property, or the cross streets, to points further removed from the marginal street.

What the Project Will Cost

"Excluding (1) the cost of acquiring title to the widening of 12th avenue between West 42d street and West 43d street required as an essential improvement irrespective of its relation to the express highway, and for which a request is now pending before the Board; (2) the cost of incidental work occasioned by interference with subsurface structures; (3) the cost of improving and restoring the surface street and marginal way; and (4) the cost of making such changes in the railroad tracks as are necessary to permit of the erection of the new structure, the expense involved in carrying out the project now under discussion, and in accordance with the plan herewith presented, is estimated as follows:

Express Highway (One Deck)—	
Easement rights (assessed valuation, say)	$200,000
Construction	13,500,000
Total	$13,700,000
Marginal Way Between West 38th and West 42d Streets—	
Land (assessed valuation)	$1,100,000
Bulkhead	200,000
Total	$1,300,000

"It is also estimated that the cost of placing a second deck over the express highway would be about $9,000,000.

"The carrying out of this project would afford an additional initial traffic capacity greater than that of any two of the existing avenues, with the further advantage that a similar increase would be afforded whenever found necessary by the provision of the second deck and, in my judgment, it would constitute the most forward step that has been taken toward the relief of traffic congestion in the Borough of Manhattan. The project also lends itself admirably to a further extension through the Borough of The Bronx as far as the City line where it could intercept the Westchester County traffic."

Under Chapter 484 of the laws of 1926 the city is empowered to acquire any property or easement rights necessary for the carrying out of the project and to assess the cost of acquisition, property damage, and construction, upon the city, or upon one or more boroughs, or both, or to meet all or a portion of the cost by an issue of corporate stock.

The funds to pay for the improvement, according to Borough President Julius Miller of Manhattan, who submitted the plan as a part of his suggestion for comprehensive traffic improvements in the borough, are to be raised entirely by assessments, levied upon property owners in Manhattan only. The Board of Estimate and Apportionment, at its meeting on June 17, appropriated funds for a preliminary survey as the first step in carrying out this important project.

Cincinnati Police to be Equipped with Pocket Cameras

EVIDENCE of crime and accidents that will be invaluable in the detection of criminals and for use in the courts will, in future, be obtained by the police force of Cincinnati, with the aid of pocket cameras which every officer will carry. Announcement to this effect was made on June 18 by City Manager C. O. Sherrill. In outlining this new plan Colonel Sherrill emphasized the usefulness of the photograph in police work and pointed out the fact that without the aid of pictures taken on the spot, valuable evidence is lost and the prosecutor has to depend on human memory, always tricky, and inadequate oral testimony of the circumstances of the crime or the accident.

After the patrolman or a detective has taken snapshots of the physical environment of a crime or accident, the films will be taken to police headquarters and developed by a special photographer.

Plans were also disclosed by Colonel Sherrill for a so-called "city reproduction plant." This will meet the constant need for good photographs in the engineering, utility, park, city planning, building, and other municipal departments. Not only will these photographs be of use in the work of the various departments, but they will prove of value for reproduction in an official municipal bulletin, the publication of which will soon be begun in Cincinnati.

Maintenance of Right of Way

By Otto S. Hess

Engineer-Manager, Kent County Road Commission, Grand Rapids, Mich.

MAINTENANCE of right of way covers all of the work incidental to the proper maintenance of highways except the work of snow removal and other activities necessary to the adequate maintenance of the road surface or wearing course. The various subdivisions of maintenance referred to include the following: (1) guard-rail maintenance; (2) shoulders and washouts; (3) care of drainage structures and side ditches; (4) maintenance of markers and signs; (5) cutting of weeds and brush; (6) forestry and landscape work. There are a number of other items of maintenance work which could be included in this list, but they are more or less special cases and not of general interest. A study of the past four years' maintenance costs of Kent County shows that the five subdivisions of work make up about 30 per cent of the total maintenance cost. Incidentally, it is worthy of mention that the cost of a majority of this work is a fairly constant factor, not greatly affected by the type of road surface or the volume of traffic.

Proper Maintenance Postpones Future Reconstruction

The evil day when the County Commissioners must ask for a bond issue to reconstruct a certain road can be materially postponed by careful, constant and correct methods of maintenance. No engineer today really believes that any road surface now laid is "permanent," but he does know that the active service of the road surface can be prolonged by maintenance. Maintenance of the right of way adds to the safety of the road.

Guard-Rail Maintenance

The maintenance and proper care of guard-rails consists mainly in rebuilding broken sections from time to time and in painting them frequently enough so that they are plainly visible at night. Broken portions of guard-rails should be rebuilt and painted as soon as possible after the damage has been done. In order to do this economically, it is necessary to keep a supply of guard-rail posts, lumber, cable, and fittings on hand at all times. It is usually advisable to buy the posts and lumber in carload lots. If the repair work is on roads which are maintained by truck patrols, the material can be taken out to the desired points by the scraper men. The men who do the repair work can then drive an ordinary passenger car from place to place as they make the necessary repairs, thus saving the cost of operating a separate truck for this work. In other cases a guard-rail repair crew of about two men, equipped with a light truck, can handle this kind of work very nicely, and carry all their materials with them.

The manner in which guard-rail painting should be handled depends largely upon the quantity of guard-rail to be painted. If the quantity is small, it is only necessary to send out a couple of men with a light car carrying their supplies with them and doing the painting by hand. For larger quantities of guard-rail, a spray machine should be used. Proper equipment for this work would consist of a 1- or 1½-ton truck with platform body on which would be mounted a small engine and air-compressor outfit of sufficient size to operate two lines of hose. The paint tank should hold about 5 gallons, this being a convenient quantity of paint to mix at one time. The best outfit is one with the engine, compressor, and paint tank all compactly mounted on a small four-wheeled truck. This kind of outfit can be quickly removed from the motor truck, thereby releasing the truck for other work when rainy weather or other conditions make it inadvisable to paint guard-rails. The paint crew should consist of two men, one to drive the truck and paint the inside of the guard-rails, the other to work on the outside of the guard-rail continuously. A crew and equipment like this can paint nearly a mile of wooden guard-rail in a day at a total cost of slightly over one cent per lineal foot, including paint. In order to do this, it is necessary to buy a first-class lead and oil paint, such as would comply with the present Michigan state specifications for guard-rail paint.

As a rule, guard-rails along gravel or dirt roads which carry a fairly heavy traffic should be painted every year. On paved roads, or other types which are not dusty, it is usually sufficient to paint them once in two years to maintain their visibility.

Shoulders and Washouts

The work involved in maintaining the shoulders of the road and taking care of washouts is in most cases a matter of hauling dirt or other material and placing it in V-shaped depressions which have been caused by the action of water. Some of the more heavily traveled paved roads, however, present greater difficulties. For instance, some of the old 16-foot concrete roads which are now carrying 5,000 or more vehicles per day are handling quite a volume of traffic on the shoulders. It is sometimes necessary in cases like these to use large quantities of gravel on the shoulders and to install a regular patrol system of maintenance to keep it smooth. For the purposes of this discussion, however, let us consider shoulder maintenance as being in the class first mentioned, assuming that the latter type of work should be charged to the surface or wearing course.

For reasons of safety and convenience it is very important that shoulders be maintained at all times in a condition fit to be traveled upon. To obtain this result, it is necessary that the maintenance organization be prepared to go out on short notice during and following storms, with the proper men and equipment to take care of this work. At such emergency times men should be sent out ahead of the regular maintenance crews to put up lanterns, red flags, barricades, etc., to warn traffic of the dangerous places. Ordinarily, the crew or unit to do the work consists of a motor truck and two or three men. The number of units sent out depends entirely upon the volume of work to be done. These crews obtain dirt or other material as close to the washouts as convenient and dump it into the holes, smoothing it up with hand shovels so as to leave the shoulders and grade in good condition again. Sometimes the side ditches are eroded so badly that something must be done to prevent further washing. This can be taken care of in a number of ways, namely, by placing stone, riprap, cobble gutters, sod or brush. It has been the experience of the writer that brush, properly placed, is about the most economical and effective method in most cases. Washouts in the backslopes of cuts can usually be prepared against further erosion by cutting ditches along the tops of the slopes and parallel to the centerline of the highway, which will lead surface water away from the points which have been giving trouble.

Washouts on the shoulders can be greatly reduced by keeping the shoulders a little low for some distance each side of the low points in grades, thus permitting the water to run off at many points instead of collecting at one place and tearing out a large hole. Sometimes it is advisable to follow an entirely different plan where there are deep valleys with steep grades leading into them from both ways, especially if the shoulders are built of sand or other unstable material. In these cases the shoulders should be kept a little high so as to lead all of the water to the low points, and at such points there should be constructed wooden or concrete chutes or possibly catch-basins to take the water away from the road without damage to the shoulders. These are only a few of the more common methods of handling this kind of work. Each heavy storm, however, presents many and varied new problems which give the maintenance superintendent a splendid opportunity to use his ingenuity.

Care of Drainage Structures and Side Ditches

It is obvious to any one that the proper care and maintenance of drainage structures, especially under heavily traveled roads is of paramount importance. The highways of practically any county contain culverts of all types and sizes. It is necessary, then, that culvert materials of many different kinds and men with the right equipment and knowledge to handle them be available. In the case of concrete culverts which are failing for one reason or another, it is often possible to prolong or delay the failure many years by bolstering up the present structure in a rather inexpensive manner. The exact work to be done is usually different for each case, and must be determined by the man in charge. For this work, as well as for concrete culverts which must be replaced by new ones, there must be equipment for mixing and placing concrete in comparatively small quantities. This calls for a truck equipped with a dump body for hauling materials, and a concrete mixer of about one-sack capacity. The mixer and engine to run it should be mounted on wheels so that it can be easily loaded onto the motor truck, and quickly transported from one job to another. The crew generally consists of a foreman, a truck driver, a carpenter, and two or more laborers. A crew of this sort can build headwalls, repair old concrete culverts, and build new culverts up to about 12- or 15-foot spans. It is the belief of the writer that replacement jobs much larger than these can be more economically handled by contract, after having received competitive bids. On all concrete work which is being handled by maintenance

crews, the same rigid inspection of materials and workmanship should be furnished by the engineering department that is usually furnished on contract work of a similar nature.

For failures in culverts of sizes up to 36 inches, and in some cases larger, the replacement may be of encased tile, reinforced concrete pipe, corrugated metal, or cast iron. If only a portion of the culvert has to be replaced, it is generally best to replace it with the same material as the rest of the culvert. If the whole culvert has failed, it is usually better to replace it with something besides encased tile, as this type does not lend itself to maintenance work as well as one of the other types which can be placed without the use of concrete mixed on the job. In localities where reinforced concrete pipe can be obtained at satisfactory prices, this type is recommended as being especially economical and well adapted to this work. It is also recommended that all driveway culverts be constructed without concrete headwalls. Field stone, laid up dry around the ends, is much less expensive, equally as satisfactory, and better looking. Without concrete headwalls these culverts can be moved, lengthened, or repaired without any loss of salvaged materials.

In all of this culvert repair or replacement work it is important that the work be done with the least possible interruption to traffic. The circular culverts can usually be placed under one-half of the road at a time, leaving the other half for traffic. The concrete culvert jobs, however, present a more difficult problem. Generally it is necessary to construct a temporary bridge or by-pass to carry traffic. The character of the detour constructed, or the amount of money spent on it, is largely dependent upon the volume of traffic which the road carries. It goes without saying that in all cases it is imperative that the proper attention be given to the correct use of signs, lights, barricades, etc., to warn and direct traffic.

No matter how well the drainage structures are maintained, they cannot furnish satisfactory drainage service without the proper attention to inlets, outlets, and side ditches, so as to allow the free flow of water. As soon as possible after the snow has left in the spring, men should be sent out on all the roads with definite instructions as to where and what to do to properly take care of this phase of the work. About all the men need is transportation facilities, shovels to work with, and proper instructions. This same plan should be followed out again in the fall just before freezing weather. Sufficient attention to this part of the work will save many times its cost later on in other branches of the maintenance problem.

Maintenance of Markers and Signs

During the past few years a fairly complete system of markers and signs has been installed on the state trunk line system of Michigan. Many of the counties have followed suit and now have a complete signing system on their county roads. Without adequate maintenance, however, such a signing system becomes almost worthless in two or three years. As the plan of caring for these signs must necessarily vary a great deal under different conditions, I will outline the methods followed in Kent County and leave you to draw your own conclusions as to how it should be done elsewhere.

To begin with, the Maintenance Superintendent is assisted by four District Superintendents. Each District Superintendent is provided with a car and is required to look after all maintenance work in his district, which, in each case, comprises about one-fourth of the county and includes 110 to 115 miles of county and state trunk line roads. He covers all the roads in his district nearly every day, and at least two or three times a week he has occasion to visit the main plant in Grand Rapids.

The signs themselves are naturally divided into two classes: the danger and warning signs, which are made of cast iron; and the distance and direction signs, which are stamped metal plates fastened with brass screws to a board back. Both classes of signs are fastened to cedar posts. The cast iron signs are rather expensive and it is therefore necessary to repaint them every year or two in order to keep them looking good. The plates for the other class of signs are comparatively inexpensive, however, and it is found to be more economical to buy new plates than to repaint the old ones. This condition has resulted in the county's maintaining a small stock of both classes of signs on hand at all times.

As the District Superintendent goes about his work, he makes a note of any signs that are in need of replacement or repainting. In a day or two, when he is at the main plant in Grand Rapids, he procures from the stockroom the particular signs he wants. The plates which he receives are new ones and the cast iron signs are probably repainted ones. He carries these signs in his car, and whenever he comes to one of the poor signs out on

the road, he replaces it with a new or a repainted one, and takes the old sign with him. The old plates are thrown away and the old cast iron signs are taken back to the stock-room on the next trip in. Whenever a sufficient number of the danger and warning signs have accumulated at the stock-room, a sign painter is set to work repainting them, and then they are again placed in stock to wait for another trip out. This plan of handling the sign job has worked out quite successfully in Kent County and undoubtedly has some distinct advantages for a county organization. First, there is no time when a post is without a complete sign. Second, the work of replacing and transporting the signs does not require special trips by any one, and is therefore economical. Third, the repainting of old signs is accomplished under more favorable conditions with more speed and better quality of work. Fourth, the weather is not a factor to be reckoned with, as is the case where signs are painted out on the road.

Although this plan of handling sign work is apparently very economical, economy is not its greatest asset. The chief advantage lies in the fact that the signing system does not have to wait for a general overhauling but is taken care of promptly and continuously, maintaining a complete and good-looking system of markers and signs at all times.

Cutting of Weeds and Brush

Only a few years ago it was the exception rather than the rule to find a road with clean-looking shoulders and the roadside free from noxious weeds and brush. Today we find a different landscape. The county which does not take care of its roadsides is considered to be negligent in its duties and a back number in highway maintenance work. In order to obtain the maximum use and safety of the highway, it is absolutely essential that the shoulders be mowed frequently. To prevent the spread of noxious weeds and to keep the highway looking right, it is necessary that the right of way outside the shoulders be taken care of.

The shoulders should be mowed at least three times during the season. A good time to start this work in southern Michigan is about the last week in June. All of this shoulder mowing, the first time over, should be completed in about two weeks, and the organization and equipment should be worked out accordingly. About a month later, the shoulders should be gone over again. The third and last mowing should be done about the last of August or the first of September. Those dates are of course only approximate, as they would naturally vary with seasonal variations. The number of mowings are about right, however, for most roads in this part of the state. This work has quite generally been handled with teams and ordinary mowing machines. In a few places Fordson tractors with mower attachments have been used. Both methods are satisfactory. There is some question, though, as to the economy of the tractor method, unless the tractor can be used during the remainder of the year on other work.

The right of way between the shoulders and the fences is usually of such a nature that mowing machines cannot be used, and consequently the mowing must be done by hand. There is no great haste about this work, and it is ordinarily satisfactory to start about the first of July and finish about the last of August. One mowing is sufficient, and it is not necessary to cut the grass. As a matter of fact, it is probably better to cut only the weeds, leaving the grass to go to seed. If this method is followed, a few years will usually see the roadsides well sodded over, with practically all the weeds crowded out. Incidentally, this plan of mowing will probably cost less than half as much as the cost of mowing the roadside clean, grass and all.

There is not much choice as to the manner of handling this work. The usual and probably the best plan is to place a sufficient number of men out on the roads with scythes to complete the job in the time required. Men can ordinarily be obtained at laborers' wages to do this work and furnish their own transportation.

Forestry and Landscape Work

A phase of our highway maintenance work that has not received the attention it deserves is that pertaining to the beautification of the roadsides. In this state, which we boastfully call the "Playground of a Nation," we are year after year passing up one of our greatest opportunities, and that is the opportunity to make our roads attractive to outsiders, as well as ourselves, by properly caring for what nature has already placed on them in the way of beautiful trees and shrubs, and by planting more in the barren stretches.

Only a few of the counties in the state have gone into this sort of work to any great extent. Kent County has been one of the pioneers, having employed a forester and carried on roadside beautification work since the summer of 1921. At the beginning of the work it was decided that the first and most important thing to do was to properly care for the existing trees and shrubs before going into any ex-

tended tree-planting program. The years which have gone by have shown the wisdom of this plan. The roads of Kent County can now speak for themselves as to the results accomplished. In starting out on a tree-planting program, it must be remembered that no results can be expected from the standpoint of the looks of the highway in less than about ten years' time. On the other hand, the proper trimming and care of existing trees and shrubs give immediate results. Of course, if funds are available for both kinds of work, so much the better, but as a rule this is not the case at the beginning of the work. In the construction of new roads it has been necessary to remove but a comparatively few trees or shrubs of any ornamental value. Only trees that interfere with the actual construction work or with traffic are removed. The trees or shrubs which add any beauty to the road or surrounding landscape have been saved where possible, and in some places changes have been made in the alignment of the road to avoid the destruction of groups of trees. The policy of the Kent County Road Commission has been to keep all roads open to traffic throughout the year, and it has therefore been necessary to cut shrubs or groups of shrubs which cause drifting of snow upon the highway. While this has been necessary in some instances, it has been found that in numerous other places the shrubs or groups of shrubs actually prevent snow from drifting by acting as a windbreak. In the case of newly constructed roads they are all thoroughly gone over by the Forester and his trimming crews immediately after the road has been accepted from the contractor.

Kent County is unusually fortunate in having a great number of large, beautiful trees along practically all its highways. These trees, many of which were planted by the old settlers, were very often neglected after planting, and as a result, when the work of preserving these trees and shrubs was started, they were badly in need of care. At the present time the entire mileage of state trunk lines and county roads on the Kent County road system has been trimmed at least once, and about 75 per cent of the mileage has been gone over the second time, with the result that all the highways so taken care of now present a very marked improvement in appearance. The improvement, however, is much more noticeable as time goes on than it is just after the first trimming has been done, as the trees and shrubs, after trimming, often take on new life and present a more thrifty and healthy appearance than before receiving this attention.

The trimming work has consisted in the cutting-out of dead, diseased, and superfluous branches, removing dead trees and shrubs, cutting off low-hanging branches which obstruct traffic or corner views, and properly pruning and thinning all existing small trees and shrubs found on the right of way. All road intersections and corners have been cleaned out and cleared of all obstructions, giving the motorist sufficient view to prevent accidents. It is interesting to note that during the past year in Kent County no accidents have been reported due to obstructions at road intersections, corners, and railway crossings. This situation never existed previous to 1925, and as there has not been a general decrease in the number of accidents, we can safely draw the conclusion that the work of cleaning our corners, etc., is directly responsible for the elimination of accidents at the points referred to.

In the development and preservation of our roadsides it has been necessary to ask the cooperation of pole-using companies. The manner in which they have cooperated with us during the past four years has been very satisfactory. They have spent large sums of money in rebuilding and relocating pole lines at our request, so that at the present time their interests conflict with ours in very few instances. On all roads that have 100 foot rights of way there is room for trees and shrubs as well as for pole lines. In locating pole lines on rights of way of 66 feet, there is no hard and fast rule to follow, as this width of roadway is too narrow for the use of pole lines without some interference of trees. The lines must therefore be located where they will interfere the least with the trees and at the same time be safe for traffic.

Because it has been deemed more important to maintain the trees and shrubs that we already have, not much planting has been done as yet, although several small stretches of roadside have been planted. In planting a roadside it is well to plant the species of trees that have been observed to thrive best in the direct vicinity in which the planting is to be done. For handling the trimming work, our Forester has been furnished with a 1½-ton Graham truck and the tools which he needs in his work. While this truck is light enough to get to and from the work quickly, it is also heavy enough to transport all the tools and the required number of men. A crew of six to eight men with the equipment just referred to work steadily on the trimming of trees and shrubs from spring to late fall. The

work of cleaning out corners and intersections is usually handled by one or two men working separately and traveling from one place to another in their own cars. This has worked out successfully and economically.

Since June, 1921, Kent County has spent for all purposes in connection with forestry and landscape work along the highways a total of $27,000. This cost has trimmed 450 miles of roads once and about 300 miles the second time. It also covers the cost of cleaning out corners and intersections and the establishment of a number of wells in miniature parks at a number of points along the highways. Some of these little parks, which were established on corners where excess right of way had been purchased, are now very good to look at and help to relieve the sameness and monotony of many of our highways. The cost of trimming this 450-mile road system the first time over, averages approximately $40 per mile. The re-trimming work costs about $5 per mile. It has been planned to go over the entire county road system from now on every year and do the necessary trimming and other forestry work which shows up from year to year. It is estimated that this work will cost $5.00 per mile or less per year.

ACKNOWLEDGMENT.—From a paper read before the Twelfth Annual Conference on Highway Engineering, at the University of Michigan.

Boiler-Room Economies

By A. W. Cole

Professor of Steam Engineering, Purdue University, Lafayette, Ind.

IT is equally true that a manufacturer, or a municipal water-works, generally considers the power-plant a necessary evil. It is therefore ignored if the necessary power is forthcoming. Nevertheless, the boiler-room and power-plant are the sources of the greatest expenses involved in any municipal electric or water works. Money is continuously shoveled into the furnace.

Heat is nature's greatest natural resource, for without it nothing could exist. Heat is a real natural resource and is stored for our future use in many latent forms in nature. Fuel in the form of coal is the most important source of easily available heat. Coal is no longer being formed upon our earth, and this source of heat can never be replaced. This source of heat, so necessary for all human comforts and welfare, should be conserved for future generations as well as for our own future welfare. This fact is ignored by most power-plant operators, much to the detriment of themselves and others.

The power-house is where such conservation can, should, and must be made by providing the very best boilers of the best design, well and properly set, proper equipment in the form of measuring instruments, stokers, and scales to measure and judge the performance of the boiler. The surroundings must be well kept and proper working conditions provided for the men. There must be proper machinery in which to use the steam after it is produced. Furthermore, proper use must be made of the exhaust steam. Men possessing knowledge of heat engineering, and enthusiastic in the plant, its equipment and its operation, must be employed. Stock must be taken from time to time by proper tests made by competent engineers to determine the efficiency of the plant.

Good Boilers and Boiler Settings

A boiler does not wear out, but it does become out of date or obsolete. Progress is so great in this field that no one can expect to use old equipment for any great period of time without some loss of efficiency in the equipment itself, but there is a much greater loss of efficiency through failure to install new equipment which has been designed with refinements making greater efficiency possible.

Boiler settings should be properly designed. Good combustion requires good mixture and adequate air supply, sufficient temperature, and time to complete the combustion process. A good boiler setting should provide all of these by giving proper and ample volume in the combustion spaces, long enough gas passages, and proper draft and by protecting the settings against radiation and air leakage. All excess air will mechanically absorb heat and carry away heat, causing a useless waste. This approximately equals 0.24 b. t. u. per pound of air per degree of temperature.

Equipment

Proper equipment for a boiler-room should include a well-designed mechanical stoker, developed especially for the type of fuel to be used. In addition, there should be standard apparatus for determining the temperature in the stack, the temperature of the steam and draft

air, the amount of air used and the amount of coal fired, with the corresponding water evaporated. This is necessary in order that the boiler-room operator may know just what heat is being derived from the investment in fuel.

Adequate first-class pipe coverings should be provided for all steam pipes, as the loss in British thermal units per square foot of bare pipe per degree of difference between the steam within and the air without, is as great as 2.8 boiler-horse power for each 100 square feet of pipe per hour, while for covered pipe the loss is practically negligible.

Draft regulation is essential for the control of excess air and flue temperature and to take care of fluctuations in the demand for steam by the power equipment supplied from the boiler. A CO_2 recorder tells how well the coal is being fired and therefore acts as a balance sheet in determining whether the maximum heat for the outlay in fuel is being secured.

A clean plant is an inspiration to the workers and a source of pride to the owners, whether they be private individuals or the taxpayers. Tiling installed about a plant, brass rails, which take but a few minutes a day to polish, and a well-painted boiler front, all add to the pride in a plant.

Eternal Vigilance Is the Price of Liberty

Watchfulness over your heat balance is just as important as watchfulness over your bank account to prevent over-drawing and consequent loss of reputation or financial standing, according to Professor A. W. Cole in this interesting and instructive discussion of different phases of boiler-room operation and economies. A careful study of this article, coupled with its direct application to your own plant, will no doubt show you at least one place where conditions may be improved.

Personnel

A modern power-plant implies officials of ability, which further implies a definite program of education among the force, which develops loyalty, and loyalty means economy. In private power-plants long tenure of office with its loyal service is common. Unfortunately, in municipal plants too frequently changes are made in personnel under influence of political pressure, much to the detriment of the service and to the great loss of the taxpayer.

Do You Know What Your Losses Are?

It has been said, "What you don't know will not hurt you," but this is not true as regards continual "leaks" from the profits of a power-plant when you do not know about them. Is it true that you are plodding along with poor and insufficient or inefficient equipment, losing money day by day? Have you a boiler in the line that should be cleaned or repaired and is therefore losing money? Is it true that you do not know whether your plant is showing a profit or a loss? If your answer is affirmative to any of these questions, it is necessary that there should be a change in personnel. A man of tried ability with experience in the proper operation of power-plant equipment should be secured as your manager or superintendent. He should be a man who will be fearless in recommending necessary changes, not merely putting on frills, but the necessary scientific instruments for the proper determination of heat production and use.

Reasons Why Your Plant Should Be in Perfect Running Order

1. It will mean money to you in the saving of fuel.

2. It will put your plant on a better business basis.

3. It will improve your standing with your employees, with supply houses and with all others with whom you do business or hope to do business.

4. It will give you ease of mind, for you can be assured that at all times power will be available and will thus enable you to use your wits and energies in building up your business or other functions in your department.

5. It is the most effective method known of making a difficult job easy.

6. It will improve your standing with your fellow taxpayers.

7. It will enable you to know the true condition of your business or departmental work at all times. Your business or your departmental work is no stronger than its motive forces.

8. It enables you to estimate your future power costs.

9. It makes it possible for you to have a better understanding with your employees and employers, thereby promoting harmony in the plant.

10. It will help in making estimates by referring to similar work done.

11. It will assure you of financial success if coupled with properly applied effort.

12. It will increase your peace of mind and your personal happiness, for you will be in a more cheerful frame of mind at the close of each day's efforts.

Balancing the Books

You balance your manufacturing or waterworks accounts at frequent intervals, but do you carefully balance the heat account of your power-plant? This is necessary to its continued efficient operation and is the only way in which its efficiency can be determined. Without a heat balance sheet, how are you going to know just the amount of heat that is going into productive work and how much is being lost through radiation or up the chimney with the flue gases?

Your heat account should balance as does your financial account, and it will if at periodic intervals you will have your plant tested by some one competent to measure the heat distribution and losses. Then, if you will gradually build up your plant under competent advice and with loyal and enthusiastic employees, your efficiency will go up and your costs go down, to the advantage of the taxpayers of your community, the consumers, the employees, and the superintendent or engineer responsible for the plant.

ACKNOWLEDGMENT.—From a paper read before the Nineteenth Annual Meeting, Indiana Section, American Water Works Association.

Highway Maintenance Truck Is Man-of-All-Work

IN Kern County, Calif., a maintenance truck has been put into service that is equipped to do practically everything in the long list of jobs expected of such equipment. It can be used for maintenance work on concrete, asphalt, macadam, or dirt roads, for the erection of steel, wooden, or concrete bridges, and the erection of fences and signs.

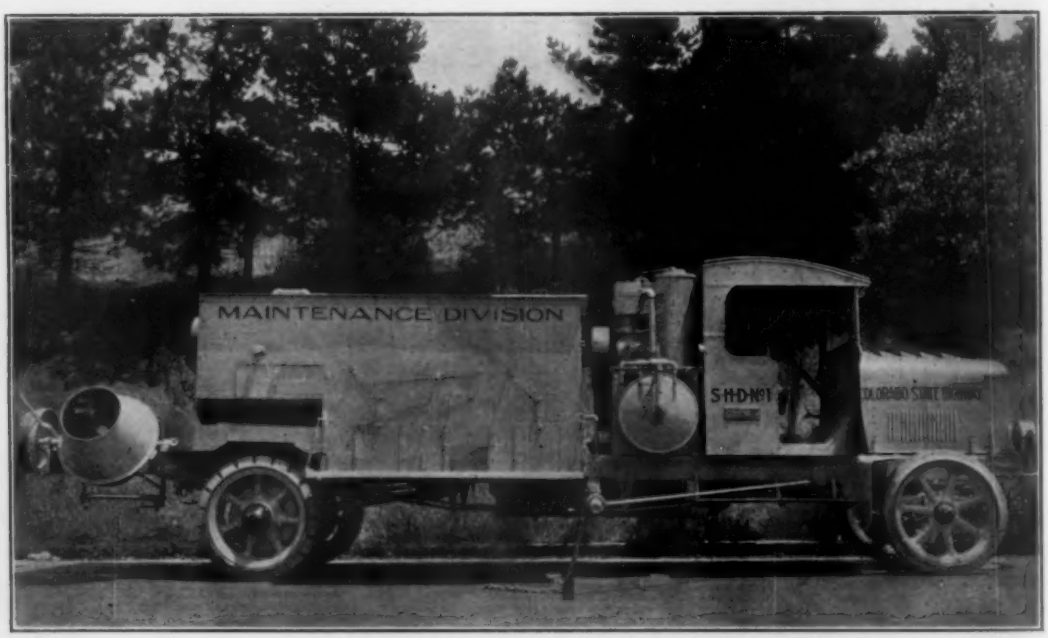
The men in the crew are thus equipped to use pneumatic jack-hammers to break up the damaged places in pavements, or the pneumatic air jet to clean out the holes. They can mix new cement in the power-driven concrete mixer, using the materials carried in the bins of the truck.

When it comes to erecting fences along the highways or putting up traffic signs, they can use the pneumatic post-hole digger, setting the posts in concrete or tamping with pneumatic tools, painting with the spray outfit.

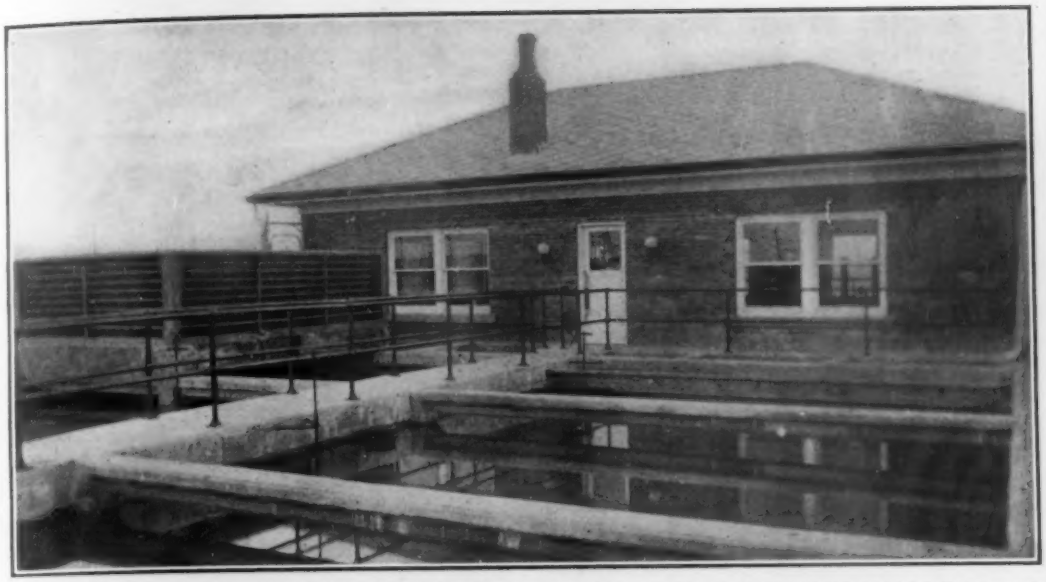
If they are to work on bridges, they can use the sand-blast outfit to remove the old paint or rust from the steel work, and they can cut or weld the steel work with the oxyacetylene outfit.

They can use the grading-plow attached to the side-arm or the rear drawbar for beveling, grading, shouldering up, rolling, or draining the right of way.

The machine is built on the standard Fageol heavy-duty truck chassis, and is kept busy at the great task of maintaining highways.



TYPE OF TRUCK USED BY KERN COUNTY, CALIF., SHOWING CONCRETE MIXER, STORAGE BINS, AND AIR-COMPRESSOR



AERATOR, SETTLING BASIN, AND COAGULATING BASIN OF THE SMITH CENTER WATER-WORKS

Prairie Town Overcomes Water-Supply Difficulties

How Smith Center, Kans., Erected New Water Plant

By M. H. Hill

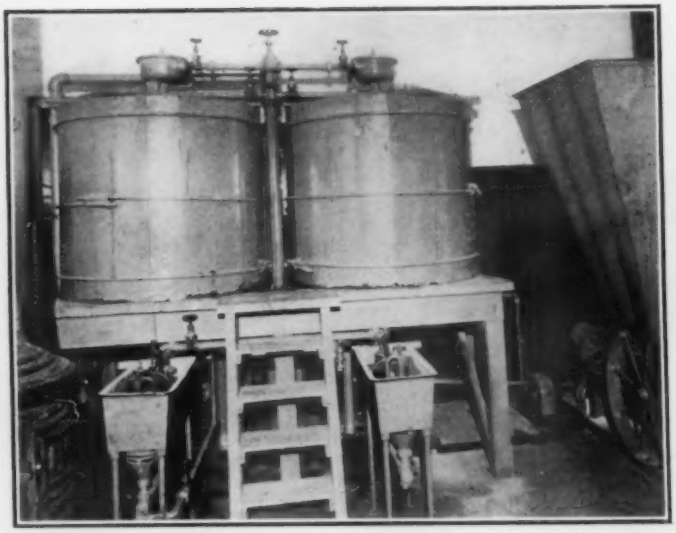
Smith Center, Kans.

OBTAINING an adequate and satisfactory water-supply is a problem in many communities, but in western Kansas it often assumes the proportions of an apparently insurmountable obstacle.

From the time the town site of Smith Center was laid out, in the spring of 1872, the subject of water always was an acute problem. Shallow wells yielded only a meagre supply, and in 1872 a well 175 feet deep was sunk in the center of the town, but without much success. A few years later the Chicago, Rock Island and Pacific Railway Company put down a well several hundred feet deep, with the same result.

In 1888 it was decided to "end the matter once and for all," and $25,000 in bonds was voted for the purpose of constructing a reservoir and steam pumping-plant at Beaver Creek, 3½ miles northwest of the town, laying the connecting mains, and erecting a standpipe 110 feet high, with a capacity of 100,000 gallons. With the first dry summer came an acute shortage, even with the very limited demands then made upon the system. The town worried along, however, occasionally repairing the reservoir, as the dam washed out with every hard rain, and hoped against hope that something would "turn up."

With a gradual increase of population and the consequently greater demands upon the system, the situation finally became intolerable. in the year 1900, after much discussion, it was decided to abandon the plant northwest of the town and seek a supply two miles east of the town, by sinking a large well just below the dam of the Chicago, Rock Island, and Pacific Railway Company. This artificial lake had supplied the railway company with water for several years, and in addition there was found to be an underground stream in the same vicinity; so every one felt the problem was "solved again." Seventeen thousand dollars was expended in digging the well, in the erection and equipment of a pumping-plant, and in the laying of the two-mile pipe line from the tunnel to the standpipe. For a short time all went well, but the first really dry, hot weather developed the usual water shortage. A few years later a concrete tunnel was built near the well to trap the overflow from the lake, at a



MIXING TANKS AND DOSING CONTROL EQUIPMENT IN SMITH CENTER WATER-WORKS

cost of $15,000, and new pumps were installed, but the supply still proved inadequate. In the years which followed, several wells were sunk near the tunnel, tapping the underground stream, and every effort was put forth to furnish a sufficient supply from the sources available, but it was impossible.

The population was increasing, modern dwellings were being erected, and both the quantity and quality of the water were unsatisfactory. With each succeeding summer and some of the winters the shortage became more painful, but every one hesitated to consider another solution of the problem on account of the enormous expense which was bound to be incurred, in addition to the water bonds still outstanding.

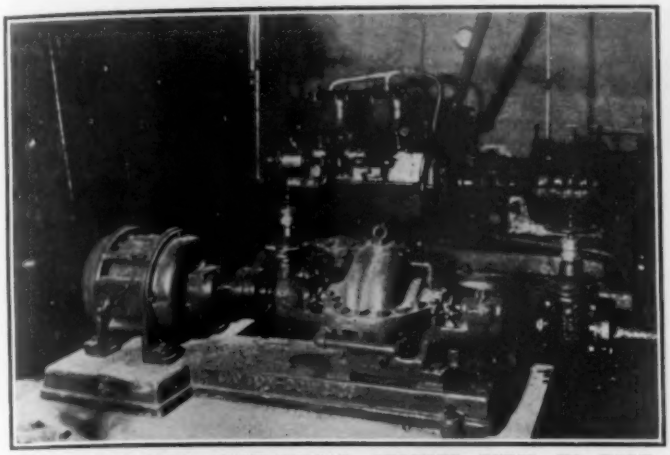
A sanitary sewer system was installed in 1920, but other local improvements were being held up. New enterprises hesitated to enter on account of the water situation, and good lawns and gardens were impossible. There often was no fire protection whatever, and a general feeling of depression prevailed in regard to the water situation.

After battling with the problem and after being defeated for fifty years, the citizens decided in the fall of 1922 that an adequate water-supply must be obtained at any cost. Engineers were employed, an exhaustive investigation was made, and early in 1923 a report covering all the possible sources of water-supply, together with their extent, cost of development, quality of water, etc., was given to the City Council.

By far the best plan was found to be to take the water from the north fork of the Solomon River near Gaylord, Kans., 12 miles distant, where ample storage is provided by the back-water from the dam in Community Park, a pleasure resort. The cost was estimated at approximately $175,000. The City Council placed the matter before the Chamber of Commerce, which is a real, progressive organization. After three weeks of intensive study, investigation, and education, a special election was called and bonds were voted for the project by an overwhelming majority.

Plans were prepared by the engineers, Black and Veatch, of Kansas City, Mo., bids were let, and the work was engaged in as rapidly and steadily as possible. In the spring of 1924 the pipe line and plant finally were completed and Smith Center began enjoying the fruits of its latest struggle for water. The summer of 1924 was a dry one and many were the predictions of water shortage by those who for personal reasons had opposed the construction of the plant, but the supply held out, the pumps worked steadily, and no shortage was experienced. The winter of 1924 was one of the coldest on record, and the same "knockers" explained that the entire system, pipes and all,

OPERATING FLOOR OF THE SMITH CENTER WATER-WORKS



ELECTRIC-DRIVEN CENTRIFUGAL SERVICE PUMP IN FOREGROUND, GASOLINE-DRIVEN STANDBY CENTRIFUGAL PUMP IN BACKGROUND

would freeze solid and the city would be without water, but their fears again proved to be unfounded. The summer of 1925 was drier than ever and the citizens sprinkled their lawns and gardens unsparingly, but the supply never faltered. Until the new system was completed, only one or two summers ever had passed without a prohibition being placed on the use of water for sprinkling.

The plant consists of a pumping-station at the river, an 8-inch cast iron main from there to the city limits, the purification plant, and a pipe line, part of which is 8 inches and the remainder of which is 6 inches in diameter, from the purification plant to the standpipe.

At the purification plant is the latest equipment in the way of an aerator, settling and coagulating basins, mixing boxes, sand filters, chlorinator, and clear-water well, together with the necessary chemical feeding equipment for coagulation either with alum or ferrous sulphate and lime, also centrifugal pumps.

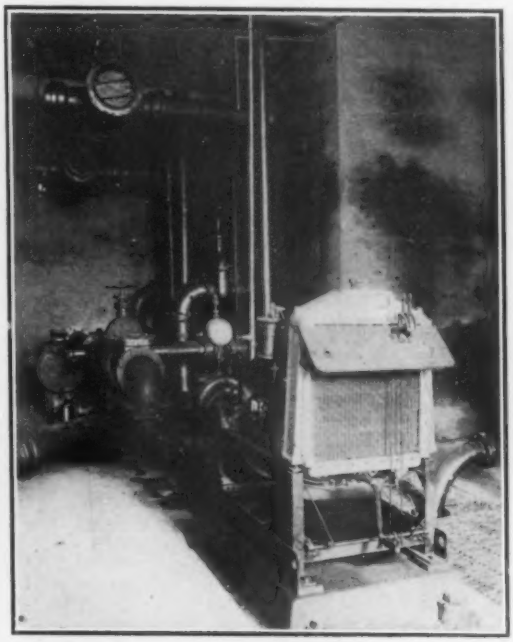
The plant has a capacity of 500,000 gallons per day, and all of the pumping equipment is in duplicate. Electricity is used for motive power with high-speed multi-cylinder gasoline engines for emergencies.

Some of the interesting facts which have been noted regarding the Smith Center water-supply are that the per capita cost is a little over $100 for each of the 1,600 inhabitants of the town, this probably being the highest per capita cost for a water-supply, exclusive of distributing mains, ever paid in Kansas. The 12-mile pipe line is said to be the longest municipal water-supply line in the state, and part of it is laid in the streets of Gaylord, a neighboring town.

The purification plant is fully equipped with well-designed chemical mixing and feeding devices, has a well-equipped laboratory room and office, a wide pipe gallery, a driveway below the window in the chemical room to facilitate the delivery of heavy chemicals, as well as wide stairways and ample doorways on both the operating room and the pump room floors; these in addition to the standard equipment common to all filtration plants.

The filter equipment was furnished by the McFarland Engineering Company, Kansas City, Mo., the pumps by Reeves and Skinner, St. Louis, Mo. The engineering work in connection with the design, preparation of plans and specifications and supervision of construction was handled by Black & Veatch, Kansas City, Mo.

This plentiful supply of pure water, which far surpasses the old well-water system in both quantity and quality, has proved a boon and blessing to the city, as it has materially increased the civic spirit of the community. Since it was completed, sixteen blocks of brick paving have been laid and a handsome white way has been installed. The solution of the water problem in Smith Center shows what community cooperation can do.



WASH-WATER MOTOR AND SECTION OF PIPE GALLERY, SHOWING INFLUENT PIPES ABOVE AND EFFLUENT PIPES BELOW

Shameful Housing Conditions in New York

To Replace Intolerable Slums Such as These with Decent Homes Is One Aim of New York's New Housing Law

"New York City, particularly the borough of Manhattan, has thousands of old houses, many of them fifty years or more old, of the most primitive planning and construction, which the wear and tear of generations have steadily depreciated until they have become shameful places in which to house human beings—places where filth and squalor almost indescribable constantly exist, with no possible hope for improvement or betterment of any kind except destruction of the buildings. These so-called homes for the poor are mostly 5-story buildings on lots 25 feet in width by 100 feet in depth, the houses being from 50 to 80 feet in depth, with no light or ventilation except from the windows on the street and on the yard. Many houses of a little later date have what is called a light shaft about the middle of each side of the houses, these shafts being from 5 to 6 feet in width by 12 feet in depth, frequently so narrow that it is possible to step from the windows of one home to those of the next one.

"Sanitary arrangements are simply unspeakable. One or two toilets on each floor supply the needs of two to four families frequently numbering from fifteen to twenty-five persons. Many old houses have only toilets in the yards, although most of these have been replaced by those on the several floors. Water-supply in large numbers of houses is obtained from one outlet on each floor in the public hall. Later-built houses have a sink with cold water only in each kitchen, hot water being obtained by heating on the kitchen range.

"No part of these houses is heated by the landlords, so that in very cold weather freeze-ups are the rule. Those of us who suffer from cold if perchance our rooms are not heated above 60 degrees in cold weather, cannot conceive how persons never too warmly clad can endure these conditions in winter, or how the reverse situation in very hot summer weather can be borne.

"Many investigations of these conditions have been made, and many reports with pictures have been published by public and private committees, in an effort to provide some means of eliminating these houses and wiping out these sore spots on our civilization. Few of these houses can be improved except by entire removal; others could be provided with more modern conveniences. All might be cleaned up and to this extent made a little more decent, but for many thousands of these houses destruction and rebuilding more modern houses is the only remedy.

"The city of New York and some of the other large cities of the state may declare such buildings unfit for human habitation and a menace to the health and welfare of the community, and order them vacated. Several of the legislative committees have examined many of these houses, and statements have been repeatedly made that certain houses were declared in 1885 to be unfit for use, but these same houses are at this time (over forty years later) still in use, and thousands of children have been born within their walls under conditions that have not been improved in all those years."

THE foregoing quotations are not the words of an alarmist. They are from an address delivered before the Civic Development group meeting of the annual convention of the Chamber of Commerce of the United States, in Washington, D. C., May 12, 1926, by Walter Stabler, Comptroller of the Metropolitan Life Insurance Company. In emphasizing the seriousness of the housing problem, not only of the laboring classes but of the "white collar" class, Mr. Stabler said:

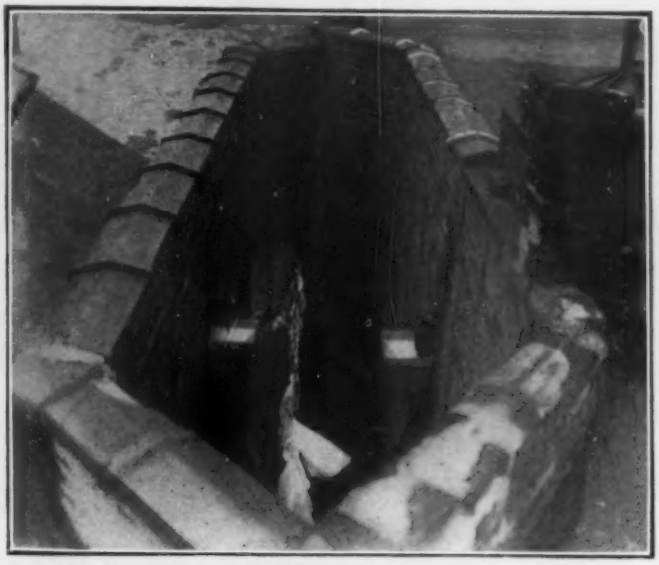
"There is a great part of the population of the larger cities for whom little has been done, to produce either amount or quality of living quarters. I refer particularly to the tenement houses occupied by the lower-paid wage-earners in all callings—the so-called "white collar" class, those of small earning power, but who must, because of their occupations, make a better appearance in public and at their work. While the wages of common labor and mechanics of all grades have been very greatly increased, enabling them to pay higher rents, the pay of the white collar class and of public employees has not been proportionately or at all adequately advanced. It is safe to say that the rents of houses required by a large majority of these have been doubled and quadrupled, making it necessary for such people to live in smaller cramped quarters. This has caused congestion to a serious extent, particularly in the larger cities, and in New York, with which I am more familiar, conditions have been unsanitary, immoral, and such as should not exist in any civilized community."

Mr. Stabler expressed his hearty approval of

New York State's new law which authorizes the incorporation of limited dividend housing companies with special powers,* but was doubtful of the willingness of any considerable number of men of means to invest funds, even in so worthy an enterprise, on a 6 per cent stock basis. On this subject Mr. Stabler said, in part:

"I have insisted that the interest rate should not be less than 8 per cent—or limited to that as a maximum if funds could not be obtained at lower rates. The rate fixed for first mortgage bonds or first mortgages was properly fixed at 5 per cent, and the Metropolitan Life Insurance Company has stated its willingness to consider loans up to two-thirds of value at 5 per cent interest. I have no doubt that other insurance companies will do the same thing, but to make the movement at all effective, large sums of money must be raised by the limited dividend companies who must "hold the bag," and I fear this will not be done at a 6 per cent return.

"It seems to me that the general plan of the New York law—if decided to be legal or, if not now in legal form, when made so—should, with permission to increase dividend rates to a higher return, eventually aid in working out this problem. To do it will require some aid from the state and the municipalities—not of money or credit, but by investing private enterprise with public or semi-public functions to be exercised for the public good, as is constantly done with franchises for public utilities needed and used by the public. This question must have some such assistance. None of us want socialistic movements to interfere with the regular operation of business effort. We may be threatened with such if we do not cure many of the evils now existing. One of the most serious is the question we are discussing. It must be solved. We cannot permit the continuance of the living conditions that affect so large a part of our urban population. This great country of ours has met many problems and conquered them. We must conquer this one, and I feel confident that this new plan as proposed by New York contains at least the germ of a solution. It must and will be perfected and made effective. New York State and City have no monopoly of these conditions. You men from other states have similar problems. I commend to your attention this first effort, and trust that before you come back here, another year, material progress will have been made by all of us."



TYPICAL "WELL"—SOLE SOURCE OF LIGHT AND AIR TO INNER ROOMS OF "DUMB-BELL" TENEMENTS

REAR VIEW OF THE CORNER OF HOUSTON AND MOTT STREETS, FROM MULBERRY STREET, NEW YORK

For contrasting pictures to those here shown, see the next two pages.

* See page 620 of the June issue.

PERSPECTIVE DRAWING OF MOTT AVENUE GARDEN APARTMENTS FOR WAGE-EARNERS, BEING ERECTED BY JOHN D. ROCKEFELLER, JR.

Future Projects Such as These Will Be Greatly Aided by New York's New Housing Law

DETAILS of the new $1,250,000 Garden-Apartments for wage-earners being built in the borough of the Bronx, New York City, by John D. Rockefeller, Jr., as a part of his effort to improve housing conditions, were made public on June 23 by Andrew J. Thomas, architect.

This new development, occupying a city block on Mott Avenue, is the culmination of a project conceived as an experiment by workingmen in cooperative housing where the welfare of the tenant-owners was the prime consideration and where speculation for profit was eliminated. The undertaking was broached a year and a half ago by a group of Needle Trades Unions, but deferred when its magnitude made the labor leaders doubt their ability to carry it through.

Realizing the tremendous importance of this venture and the menace to better housing that might follow failure, the labor leaders cast about for someone better able to handle so important and extensive an undertaking. Because those labor men believed in the sincerity of Mr. Rockefeller's purpose to contribute toward the solution of the housing problem, they consulted with him and finally requested him to take the property off their hands and carry out the project. This Mr. Rockefeller was glad to do for the unions, refunding to them their full outlays.

The union officials were satisfied that the same ideals which prompted them in initiating the Mott Avenue venture also inspired Mr. Rockefeller. Every effort, it was made clear, would be exerted to bring about economies in construction and operation, and these economies would accrue to the benefit of the wage-earners who would live in the house.

The new building will be of steel and brick construction, five and six stories in height. There will be accommodations for 175 families, a physician's quarters, and five stores on Sheridan Avenue. The apartments will be of four, five, six, and—a few—seven rooms, with two baths in the six- and seven-room suites. All will have cross-ventilation, many having windows on three sides. Windows on Mott Avenue face the beautiful Franz Siegel Park, which extends from 152nd Street along Mott Avenue and the Grand Concourse to 164th Street.

Special Provision for Children and Mothers

Every apartment opens upon the great central garden which occupies more than half the total area of the block. At no place is this garden less than 62 feet wide—more than the width of a city street— and in most places it ranges from 111 to 170 feet across. In the center will be a Japanese rockery with a native footbridge across running water. The garden will be set with shrubbery and walks arranged in artistic landscaping.

Special provision has been made by Mr. Thomas for the children and their mothers. On the ground floor are nursing rooms provided with every convenience to facilitate the

care of infants. There is also a large indoor playground fitted with gymnastic apparatus for use by the older children in bad weather. This gymnasium opens directly upon the outdoor playground in 159th Street, a short distance from Sheridan Avenue, so that in effect there is really one large playground with a covered section. Sand-boxes, swings, and slides will be placed in the open playground.

Architectural effects will be obtained principally by mass treatment with occasional details to relieve the larger lines. The building will be constructed of Holland brick, of light buff and variegated colors. The lower story will be trimmed with limestone and the entrance will carry carved motifs. Architectural terra cotta and terra cotta loggias will be used in the upper stories. Hand-wrought ornamental features and balconies and garden railings, and hand-hewn oak gates and doors complete the elements of the design. There are no clothes lines to mar the view from any window; all wash will be dried on the roof, dumbwaiters carrying the clothes baskets from apartments to the top of the building. Nor will fire-escapes obtrude themselves, for they have been tucked away in corners of the building where they cannot spoil the view. Three heating plants will provide steam heat and hot water.

Discussing the Mott Avenue project and the tremendous advance made in the last few years by the movement to improve housing conditions for wage-earners, Mr. Thomas said:

"This project, while but another experiment in the large problem of housing which has become so vital to society and the state, is of great importance in view of the housing bill passed by the Legislature last month upon the urgent representation of Governor Smith. The Mott Avenue building was designed and the contracts were let while the fate of the bill was still in doubt. However, Mr. Rockefeller is extremely desirous of giving to the occupants all the benefits which would have accrued under that legislation. Every effort will be made to that end.

Recent Experience in Industrial Housing

"I would like to take this opportunity to sketch briefly certain experiences of the past three and one-half years. August 16, 1922, President Haley Fiske, of the Metropolitan Life Insurance Company, turned the first spadeful of dirt on the great experiment by his company. The success of the three blocks in the borough of Queens, where 2,200 families have been living two years in beautiful homes which rent for $9 a room a month, is known throughout the world. A new standard of living

METROPOLITAN LIFE INSURANCE COMPANY'S NINE-DOLLAR-A-ROOM DEVELOPMENT IN QUEENS, NEW YORK CITY

was established by these houses. Important as is the social significance of the Metropolitan housing, the real lesson taught was that the future of housing development lay in large-scale operations. It is only through economies effected by the honest and earnest coperation of capital and labor, by construction in block units, and the advantages derived from highly desirable store properties in the blocks, that moderate-priced, modern city garden-homes for wage-earners are possible.

"Shortly after the Metropolitan construction was begun, another experiment was tried, this time in Bayonne, N. J., by John D. Rockefeller, Jr., the Standard Oil Company, the Tidewater Oil Company, and several other men of means and large concerns. The tenement problem and the housing situation so acute in New York City were present in a somewhat different form in Bayonne. The striking difference between the two developments lay in the fact that the Metropolitan housing enjoyed the benefits of the New York tax exemption law, which amounted to about $1.50 a room a month in the tenants' rent. There was no tax exemption in New Jersey. Added to this actual cash difference, the Bayonne block was provided with larger rooms, with two baths in the six-room apartments, with a garden one-half again as large as that of the Metropolitan, and with a playground for the children under the guidance of a trained plapground director. Notwithstanding all this, the Bayonne rentals are only from $9 to $10.25 a room a month.

"With the accumulated experiences of the Metropolitan and the Bayonne housing, Mr. Rockefeller sought an opportunity to experiment on Manhattan Island. He wanted to see just what rent would have to be charged when every factor militated against economy and low rent. Land was purchased at Avenue A between 65th and 66th Streets that cost $20,000 a lot—truly a high land valuation. The building was on a small scale, only 200 by 100 feet. Rock had to be blasted from the entire development and there was not the slightest possibility of renting a store. Nevertheless the Avenue A development when completed showed it was possible to provide modern, attractive garden apartments to wage-earners at a rental not in excess of, and in some instances considerably lower than, that which was being paid for far less desirable roms in similar localities.

"The work at Mott Avenue has now proceeded so far that it is possible to predict it will be ready for occupancy late in the fall. As soon as the financial and legal problems are solved, the cost to the tenant can be determined and announced.

"The rooms are the largest of any of the experiments so far attempted, as the following typical dimensions show:

Living-rooms	11 x 15 feet;	11 x 16 feet
Dining-rooms	11 x 14 " ;	12 x 12 "
Bedroom, main	11 x 13 " ;	10 x 14 "
Bedroom, minor	10 x 11 "	
Bedroom, guest	9 x 12.6 "	and extra bath
Kitchens	7 x 12 "	

"In my judgment any house that occupies more than 55 per cent of the ground area is economically and socially unsound. The Metropolitan, Avenue A, and Bayonne houses have proved me correct. The Metropolitan occupies 52 per cent of the area; Bayonne 33 per cent, and Avenue A 51 per cent. Mott Avenue occupies only 46 per cent.

"The outcome of the experiment at Mott Avenue is awaited with great interest by both capital and labor—the former to obtain further proof that it is possible to build adequate houses for wage-earners under present economic conditions and earn an investment return, and the latter for further proof that these houses can be brought to them at a price which they can pay without encroaching upon the other items in the family budget. There is every reason to believe that Governor Smith's vision of beautiful homes for the masses who now live amid the terrible conditions of the slums is on the road to realization."

Saving Firemen's Lives by Making "Blind" Bravery Less Necessary

THE Industrial Commission of Wisconsin, in a bulletin dated May 6, 1926, urges that to protect the lives of firemen, courage and bravery must be guided by intelligence and knowledge, and "blind" bravery avoided wherever possible. The immediate occasion for the bulletin is a recent fire which resulted in five deaths and seven injuries to the fire-fighting force. The Commission says:

"Under the provisions of state law firemen must inspect periodically all buildings within their respective cities except private residences.

"To fight fire intelligently, the firemen must know the building in which the fire occurs, the location of stairways, elevators, partitions, communicating doors, other exits, open partitions, walls, shafts, etc., also the dangers arising from open elevator shafts, light walls, weak walls, partitions and roof supports, etc., and must know the dangers to life arising from hazardous conditions and dangerous manufacturing processes.

"Small fires, seemingly extinguished after a few minutes of work, have often become disastrous fires, because the department did not know the many flues, vertical openings, openings in firewalls, concealed spaces, and other avenues for fire to spread. Only close inspection of a building will give this important information.

"It is common knowledge that dynamite or gasoline storage or a process in which flammable oils are used constitutes a serious danger to firemen. We must learn that other things are just as dangerous. Explosions in flour mills and grain elevators have occurred often. Only a few years ago, at Manitowoc, an explosion of aluminum dust caused the death of six employees. This Milwaukee fire is reported as a sawdust explosion. We are safe in going further and assuming that any dust fine enough to be held in suspension in the air is explosive.

"The start of the explosion may come from spontaneous ignition, smoking, matches, sparking switch or motor, breaking of a light globe, or defects in wiring or fixtures.

"The department must also know the hazards arising from various chemicals involved in a fire.

"Truly, the modern fire chief must be a student as well as a commander of men."

How Santa Ana, California, Planned Its Street Lighting

Abstract of Report to Board of Trustees by City Engineer

WHEN Santa Ana, Calif., was considering its street-lighting problem seriously, the Board of Trustees instructed Nat H. Neff, City Engineer, to prepare a report outlining the best practice in street lighting as applied to Santa Ana, which has a population of 32,000.

Mr. Neff in his report states that the first step in designing a lighting system is to zone the city and lay out the streets in accordance with its six subdivisions, which are: (1) principal business streets; (2) secondary business streets; (3) main traffic arteries; (4) secondary traffic arteries; (5) residential streets and park drives; (6) highways and undeveloped sections. Some classifications may include manufacturing and wholesale districts, but these may usually be placed under traffic arteries or secondary business streets. The general lighting of the street itself is of prime importance, but special attention should be paid to the intersections, for it is these points that have the greatest dangers from cross-traffic.

In planning a system of exterior illumination to meet the requirements of the city of today, the needs of each section of the city must be carefully considered. The shopping centers demand one type of illumination, peculiarly their own. The residential streets, open parks, drives, and outlying districts each in turn require special consideration and quite different treatment as regards both the illuminating unit and the ornamental standards or fixtures employed.

RESIDENTIAL STREET LIGHTS IN SANTA ANA, CALIFORNIA

TYPICAL BUSINESS DISTRICT SCENE SHOWING TYPE OF LIGHTING UNIT IN SANTA ANA

The lighting of business streets requires, in addition to the usual purpose of good general lighting, an illumination tolerable and pleasing to the eye, yet sufficiently brilliant to produce a marked effect in the improvement of business by attracting people to the brilliantly lighted thoroughfares and at the same time allowing their attention to be drawn freely to the matters of most importance—the attractive window displays and decorations.

This object is largely obtained by means of contrasts between the color schemes employed in these decorations and the color of the general illumination. Other important considerations are the appearance of the lighting unit, the illumination of the building fronts from both esthetic and economic viewpoints, and the daytime appearance of the lighting standard—dignified, simple or ornate, as harmony with its surroundings requires, and yet unob-

trusive, and free from overhanging arms and glassware that might impede traffic and endanger pedestrians.

The problem of laying out a "white way" is quite different from the problem of lighting the streets of the residential section. The latter is largely a utilitarian one and bears on the matter of police protection and suitable lighting of pedestrians, motorists, and other users of the thoroughfare.

Residential street lighting is from its very nature of low average intensity. As this class of lighting comprises a relatively large percentage of the city's streets, it is important for obvious reasons that the most efficient suitable units be used. It is desirable also to employ as few light sources as possible for a given average intensity of illumination, since the apparent effect produced by many small light sources is that of a very much lower intensity of illumination because the only images produced on the retina of the eye are those of the light sources themselves.

In residential street lighting the principle of silhouette lighting should be employed; that is, most of the seeing is accomplished by the discernment of objects in contrast with a lighted background, which is usually the street surface, rather than by the light reflected from the objects themselves. A non-uniform illumination is more desirable for this kind of lighting than one extremely uniform.

We are all familiar with the difficulty of seeing by moonlight under certain conditions. Discernment of objects is practically impossible if the moon happens to be within the range of vision, while with the moon at the observer's back the ability of the eye to discern objects in silhouette against the lighted background is greatly improved. So it is with the uniform low-intensity illumination obtained with the use of small units; if the light sources should be removed absolutely from the line of vision, such low-intensity illumination might be used.

The proper lighting of drives, highways, and parkways requires the use a of specially designed lighting unit which combines white lights with maximum efficiency and a low maintenance cost as well as a low initial cost when compared with the installation of many small units of low candlepower. The cost of installation of such lighting is a serious factor, for there is usually comparatively little money available for this class of lighting. The requirements of such illumination are not greatly different from those of the residential streets described above, that is, in the employment of the silhouette principle of lighting.

The tendency in street-lighting practice today seems to be along lines in the general direction of using still higher powered units. At the outset the use of two light-standards giving high-powered arcs was confined to the illumination of public squares and to the large areas. However, as early as 1914 entire streets began to be lighted in this manner, and there is now a definite movement toward standardization of the twin-light units using high-intensity lamps for the illumination of the business districts.

Committee on Planning and Survey Appointed by Mayor Walker of New York

Membership Now Numbering 480 to Be Divided into Seven Subcommittees

DEVELOPMENT based on comprehensive planning rather than on vociferous clamor is the aim of the present administration of New York City, as outlined by Mayor James J. Walker at the organization meeting on June 21 of his newly appointed Committee on Planning and Survey.

The 480 representative citizens from the five boroughs who have thus far been appointed to the committee will be divided into seven subcommittees, as follows:

1. Housing, Zoning and Distribution of Population
2. Port and Terminal Facilities
3. Traffic Regulation and Street Uses
4. Sanitation and Harbor Pollution
5. Highways and Bridges
6. Parks and Recreational Facilities
7. New Sources of City Revenue

These seven subcommittees will have before them the stupendous problem of attempting to guide the future development of a metropolis which now has within its city limits over six million people; which is spending for municipal purposes over a million and a half dollars for every working day throughout the year; which has on its payroll over 116,000 officials and employees; and which is struggling with traffic control and facilitation on more than 4,500 miles of improved streets.

The fundamental problems, as stressed by Mayor Walker in his address at the organization meeting, are those of distribution of population and of provision for decent living conditions for every man, woman and child within the city limits.

The Mayor announced the acceptance by Judge Morgan J. O'Brien of the chairmanship of the general committee; and that Joseph A. Warren, Commissioner of Accounts of the City of New York, had consented to serve as Secretary.

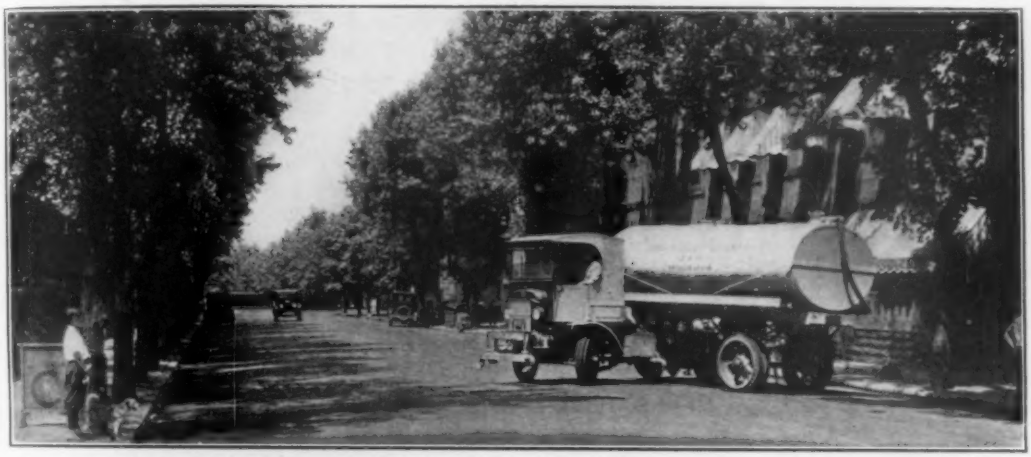
The Chairmen of the seven subcommittees, when appointed, will be members of the Executive Committee, which will be the central clearing-house for the whole investigation. In addition to these chairmen, there will sit on the Executive Committee the Chairman, the Vice-Chairman, and the Secretary of the General Committee, and five other members at large, to be appointed by the Mayor.

Flusher Evolution---The Changing Factors in Street Cleaning

By Archer M. Soby and John H. Nuttall

Chief, and Principal Assistant Engineer, Respectively, Bureau of Street Cleaning, Philadelphia

THE composition of street dirt and the factors controlling its removal have changed progressively during the past two decades. The rough stone block or cobble street laid on natural soil or gravel base, with the spaces between the blocks filled with sand or gravel, has been superseded by smooth surface asphalt, or granite block with cement grout or bituminous mastic filler on concrete base. The quantity of actual fine dirt originating from the new type paving is considerably less than arises from the old blocks, and the quantity or litter upon our streets has increased so that the refuse of today more nearly resembles rubbish than it resembles the street dirt of the past.



ONE OF PHILADELPHIA'S NEW TRAILER-TYPE FLUSHERS, SHOWING SHORT TURNING RADIUS

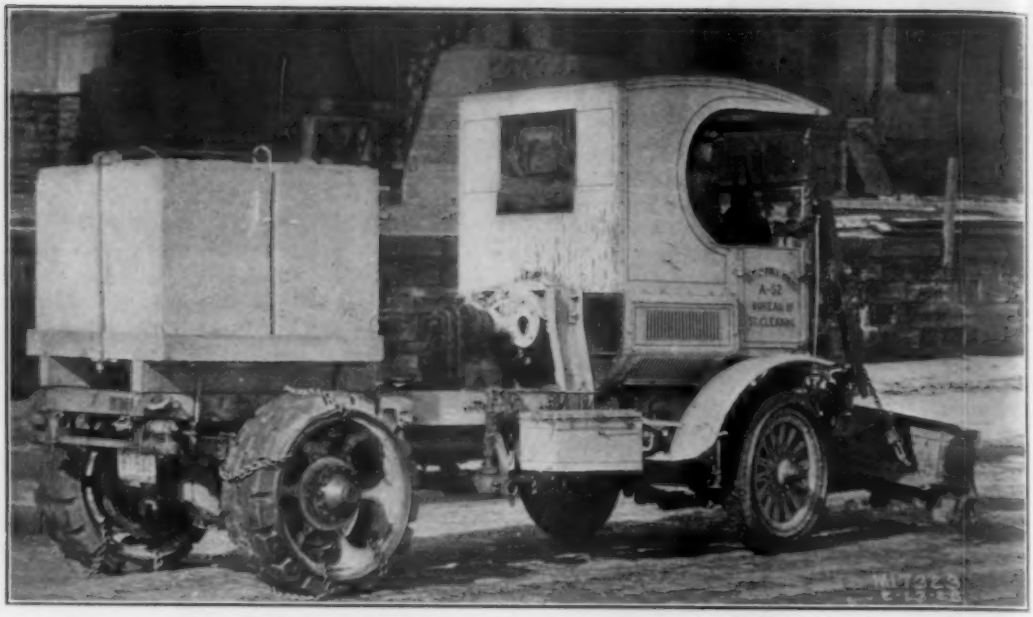
The factors controlling the removal of the dirt have also changed. The increase in vehicular traffic has rendered it difficult to operate cleaning equipment during certain hours of the day, and the use of the street for parking purposes has rendered it difficult to clean the shoulders and gutters except between the hours of 2 and 7 A. M. During the time that these changes have been occurring, the standard of street cleanliness has risen, and clouds of dust that were once common in many cities, especially in the spring, would not now be tolerated.

Changes in Cleaning Equipment

It has been necessary to change and improve cleaning equipment and methods to meet the new conditions. The horse-drawn machine broom preceded by a sprinkler is still the most efficient method of cleaning rough block streets unobstructed by parked vehicles, as it removes all dirt which it is practical and possible to remove from pavements of this character. A superlative degree of cleanliness is not possible on such paving, as dirt which is removed by cleaning methods is produced anew from the filler in the pavement. It is not possible to clean a street of this character by water jets sufficiently strong to move all heavy dirt and litter, as the jet will tear the filler from between the joints and produce more fine dirt than is removed.

The problem is entirely different upon the modern smooth paved street. The machine broom removes the heavy dirt and litter, but the fine dirt and a film of oil emulsified with dust and water remains after the broom has passed.

Cleanliness according to modern standards on smooth paved streets can be secured only by the use of water, and several methods of application are used successfully. The most perfect practical cleaning can be produced by the continued application of a high-pressure hose stream upon a pavement surface, but this method of cleaning is expensive and wasteful of water. The squeegee machine, which consists of a sprinkler tank and revolving



TRACTOR UNIT EQUIPPED FOR SNOW-REMOVAL WORK

rubber-finned squeegee upon a horse-drawn or motor-driven vehicle, is still in favor in Europe but no longer popular in this country. This machine is economical of water and performs excellent cleaning upon perfectly paved streets, but is not successful upon rough paved streets or those containing holes or depressions. The use of machine brooms and squeegees is impractical in the traffic sections of modern American cities because of parked cars, one-way streets and traffic, except during certain hours of the night and early morning.

The flusher eliminates many of the objections to the previous methods of cleaning. It removes both heavy litter and fine dirt, removes dirt from cracks, holes, and depressions, cleans under parked cars, is economical and rapid. Objection has been made that flushing fills catch-basins with dirt, wears out the paving, and splashes pedestrians. The first two objections are not worthy of consideration, and the latter is dependent upon the proper operation of the flusher. All forms of water cleaning are subject to weather conditions, and the flusher, in common with all previous cleaning methods, cannot operate at temperatures below freezing.

The increase in flushing as a method of street cleaning has been accompanied by the evolution of the flusher from the earliest horse-drawn air-pressure flusher to the present large motor vehicles. The earliest flushers were horse-drawn and consisted of a tight tank in which air was compressed by the entering water from a fire-hydrant until the pressure of the compressed air equaled that of the water. The water was expelled from the tank by the pressure of the air within, which gradually decreased from the original pressure to nothing. This type flusher was necessarily unsatisfactory and was superseded by a horse-drawn flusher upon which a single-cylinder gasoline motor and pump was mounted. The horse-drawn flushers were followed by motor-driven flushers of two principal types: the single-unit type, in which the pump is driven from the propeller shaft in front of the engine, or from the transmission; and the double-unit type, in which a separate motor drives the pump. Each type has its proponents, but there appears to be little reason in most cases to prefer one to the other. The evolution of the flusher has not yet been completed, and it is probable that the future will see increased efficiency, improved design, and newly perfected ideas in this type of equipment.

Factors Controlling Flusher Operation

Street dirt may be of considerable size, or fine dust, and may be either loose or adhering to the paving. Its removal by means of water necessitates the application of sufficient water at sufficient pressure for a sufficient length of time at the correct angle in order to carry large articles to the gutter and remove adhering materials and films from the paving. These factors are interdependent. The quantity of water is determined by the nozzle opening, the time

of application, and the pressure. The pressure is limited by the necessity for preventing splashing. The time of application is dependent upon the speed of the truck. The correct angle and shape of opening have been determined and standardized at what is probably the most efficient arrangement possible. The forward speed of the flusher is limited by traffic conditions, the liability of accident when driven at high speeds on wet streets, and the necessity for slow speed in order to permit sufficient time of application. Practical experience has established a pressure of 40 pounds per square inch as the maximum that can be used without serious danger of splashing, and ⅓-gallon of water per square yard as the necessary quantity of water at that pressure that is necessary to remove average heavy dirt. This quantity and pressure are sufficient for excellent cleaning at an actual average flushing speed of 3½ miles per hour. The speed of the truck is a controlling factor, as heavy dirt is moved twice as far at a speed of 2½ miles per hour as at 4 miles per hour. Exceptionally heavy dirt, or dirt which adheres to the pavement, may be removed by flushing at lower speed, as established by tests made in Philadelphia in 1925.

Flusher Operation in Philadelphia

An extensive investigation of flusher operation was made in Philadelphia in 1924, which led to the operation of flushers in that city on definite time schedules, an account of which was published in THE AMERICAN CITY of February, 1925. Schedules were based on the following cycles as determined during the investigation: flushing, 50 per cent; loading, 49 per cent; delays, 1 per cent. This was simplified to the following for practical purposes: loading, 50 per cent; flushing, 50 per cent.

The 26 flushers in use at that time comprised 21 single-unit, 1,500 gallons capacity; 3 single-unit, 1,750 gallons capacity; and 2 double-unit, 1,500 gallons capacity. It was apparent that because of the physical limitations imposed upon the flushing equipment, any increase in efficiency per unit beyond that obtained with the improved schedules must be obtained by decreasing loading time, as the flushing speed could not be readily increased. Loading consists of five operations: first, travelling the distance from the point where flushing has been discontinued by reason of the finishing of the water, to the plug; second, the connection of the flusher to the plug; third, the actual filling time; fourth, the disconnection; and fifth, the return to the point where flushing was discontinued. All factors, excepting the actual loading time, will be constant for any capacity flusher. The time between the completion of one load and the resumption of flushing is often far greater than the theoretically perfect time, as the loading period is used for loafing, conversation, and the filling of pipes and lighting of cigarettes by the drivers. The logical method of decreasing the total loading time would be to reduce the number of loads required, which implies the increase of tank capacity.

One thousand five hundred gallons of water weighs approximately 6¼ tons; 1,750 gallons weighs 7¼ tons, which is the limit of weight upon a four-wheel chassis in many states, and to increase flusher capacity beyond this point necessitates the use of six wheels. The six-wheel chassis driven through the middle and rear wheels is in common use for modern passenger busses, but a truck of such long wheelbase is difficult to maneuver in traffic and in narrow streets, especially in view of the character of driver whom it is often necessary for municipalities to employ. The tractor trailer type was suggested as possessing the advantages of easy handling in traffic, and the possibility of using the tractor unit as a snow-plow or for miscellaneous tractor purposes in the winter. Doubt was expressed as to the possibility of securing a tight pipe joint between the tractor and the trailer unit, and objection was made that the over-all length would probably be excessive. After consideration of the advantages and objections, specifications were finally drawn, bids received, and ten 2,750-gallon tractor trailer flushers delivered. The low bidder for the tractor units was fortunately a company whose trucks are considerably shorter than those of any other make. The ten flushers were delivered in the latter part of 1925, and have operated as flushers continuously since that time except during freezing weather.

Performance of Tractor Trailer Flushers

Flushers are used as snow-plows in Philadelphia in winter, but the variations in our climate are so great that a heavy snow is frequently succeeded by a period of balmy weather, and flushers are used to clean the streets on every possible occasion in the winter when the weather permits. The 26 flushers which we possessed, in addition to the 10 new flushers, were sufficient in number for plowing purposes, and for this reason the trailers were removed from only four of the new flushers, and the tractors were equipped with plows. A 4-ton cubical block of scrap-iron concrete was mounted over the rear axle of the tractor. The tractor units were excellent as plows, and far superior to the four-wheel flushers because of

	Four-Wheel, 1,500 Gals.	Six-Wheel, 2,750 Gals. (Reduced to time basis of four-wheel type)	Per Cent +Increase —Decrease
WORK PERFORMED			
Length per shift	69,860 lin. ft.	93,145 lin. ft.	+33
Area per shift	205,201 sq. yds.	268,000 sq. yds.	+30
Time per mile flushing	18.5 min.	17.0 min.	— 8
Length per total hour	8,088 lin. ft.	10,710 lin. ft.	+33
Length per flushing hour	17,694 lin. ft.	18,629 lin. ft.	+ 5
Area per flushing hour	51,665 sq. yds.	53,580 sq. yds.	+ 4
Area per total hour	23,704 sq. yds.	30,804 sq. yds.	+30
DETAILS OF TIME CONSUMED			
Repairs and adjustments	8.6 min.	4.1 min.	—52
Idle travel	19.3 min.	13.0 min.	—32
Miscellaneous	10.7 min.	10.0 min.	— 7
Total time lost	38.6 min.	27.1 min.	—30
Loading	244.9 min.	195.0 min.	—20
Flushing	238.6 min.	300.0 min.	+25
Total	522.1 min.	522.1 min.	
DETAILS OF WATER			
Loads per flusher	41	31	—24
Time per load	5.96 min.	6.3 min.	+ 5
Gallons per flusher	62,950 gals.	85,250 gals.	+35
Gallons per lin. ft.	.90 gals.	.90 gals.	
Gallons per sq. yd	.32 gals.	.32 gals.	

their short wheelbase, smaller projection of plow, and greater traction secured by the weight immediately over the driving wheels. The flushers have fulfilled expectations, excepting that the straight thread joint has been the cause of excessive leakage in some flushers, and will probably be superseded by a universal joint of another type. The tanks of the flushers are set too high above the ground, and the clearance will be decreased in any future specifications.

The increased length and area covered by this flushing unit over the smaller capacity flushers formerly used is shown in the table.

The cost per linear foot and yard of area is considerably less per unit at equal cost of operation with this type than for smaller capacity flushers, but it is unfair to compare the cost of operating new trucks with the cost of those, most of which have been operated for at least 70,000 miles during a period of six years.

This type of flusher has proved its value; and while it cannot be recommended for the replacement of the four-wheel flushers under all conditions, it offers many advantages for operation in large fleets in great American cities.

Street-Railway Paving

By J. W. Howard

Consulting Engineer on Pavement, New York City

BECAUSE of the presence of a street railway in a street or road and its use by trolley cars, the initial cost of the construction of the pavement per square yard in track areas is more than that of pavement outside of track areas, and the repairs to pavements in the near track areas cost many times that elsewhere.

In repaving streets recently in many places in New Jersey and elsewhere, it has been found necessary to isolate the track areas by using deep granite headers with the tops flush with the pavement on each side and away from the outermost rails. This was done to conserve the pavement in the area on the sides of the streets and has added many years to their lives. This isolation of tracks confines injuries due to the trolley cars to the track area pavement. It was all the more necessary because in many cases the track system is poorly built and insecure, often because weak and inferior types of railway construction or repairs, including worn stone blocks, were used by trolley companies in the track areas, or because paving had been neglected for several years by the trolley companies.

The dual administration by cities and trolley companies can never be in accord as regards proper construction and repairs of pavements within and near tracks. A city, county, or state should not permit a track area to be paved unless the track construction is solid and satisfactory and in a condition acceptable to the authorities. No municipality can afford to lay and maintain pavements in track areas over insecurely constructed track systems. In most cities pavements are guaranteed by the contractor for a period of two to five years. No

contractor or bonding company would give a guarantee to pavements in track areas.

Pavements between and adjacent to poorly constructed or poorly maintained tracks would be a very great expense to the public. To assess such cost or any part thereof on the taxpayers would be using the public money for the benefit of a private railway corporation and would be taking taxpayers' money without due recompense. Hense, it would be unconstitutional. It cannot be legally assessed either against the abutting property owners or the taxpayers at large. To do so would cause taxpayers' injunction suits and refusals to pay illegal assessments.

The repair and maintenance of pavements in good condition within and adjacent to track areas is much greater, as previously stated, than for corresponding types of pavements away from track areas or in streets having no tracks. This is due to various causes mentioned below, arising from railways being so situated.

The poor types of construction of tracks and of track area paving often damage pavements beyond repair. The wooden ties are frequently not creosoted and consequently decay. The rail movements on the impact of trolley wheels soon cause the rails to move vertically, cut into the wood ties, and destroy the pavement between the rails and adjacent to them outside the track area.

Even under the best types of United States general street railway construction, the vibration of rails causes an opening all along between the rails and pavement which permits water to enter under pavements to their injury, and in winter this water freezes and heaves the pavement, a damage which increases progressively.

The heavy impact of all car wheels breaks up the pavement adjacent to rails and in many cases forces the stone blocks and other pavement adjacent to the tracks outward and upward. This damage is today far more severe than that caused by the feet of horses or mules. The average weight of a horse-car was only one-fifth the weight of an average trolley car.

The franchises of many trolley companies require the use of the best modern types of street rails, which are grooved flat rails, and permit the vehicles to cross them in any direction without bumping and facilitate street drainage and street cleaning. Lately an old-fashioned type of rail has been used, with an L or step which leaves a depression on the inside of each rail. These rails impede direct or diagonal crossing by automobiles and cause extra impact and damage to pavements on both sides of all such rails, which also causes skidding of automobiles. Cities could never pay for paving where such rails are used, nor properly repair pavement near them.

The damage to pavement due to the presence of rails and use by trolley cars with their unavoidable vibrations and impact, is far greater than that done by the light horse-cars and the horses' hoofs of long ago.

The presence of tracks was the principal cause of ruin of the wood block pavement on Broad Street, Newark, N. J., so that it became irreparable after ten years' service. Its cost was about $400,000 and it had to be entirely replaced in 1925 over the entire street at about the same expense. West Park Street, Newark, N. J., has no tracks and has a wood block pavement that was there for 20 years in

Who Shall Pave Street Railway Areas?

The accompanying text was prepared at the request of the New Jersey State League of Municipalities as a means of combating Senate Bill No. 37 of the state of New Jersey, which is an act concerning the paving. repaving, and repair of streets, roads, and highways by street railway companies, traction companies, and companies operated as street railways. The first paragraph of the bill reads as follows:

"1. Every street railway company, traction company and company operated as a street railway shall, at its own expense, replace the surface of every street, road or highway, disturbed by it in the construction, reconstruction or repair of its tracks in the same condition as before the disturbance thereof to the satisfaction of the board or body having charge of such street, road or highway. The obligation imposed by this act shall be in lieu and substitution of any and all other obligations of any such company to pave, repave or repair any streets, road or highway or to pay any part of the cost thereof and may be enforced in the same manner as similar obligations are or may be enforced under the laws of this state....."

The bill was passed by the New Jersey Senate, vetoed by the Governor, and again taken up for passage over the veto. While there were enough votes in the Senate to pass it over the veto, it was found that there were not enough votes in the House, so the bill was not moved. It is therefore defeated. A bill of the same intent, and purpose failed to become law in the New York State Legislature at its last session.

good order. Washington Street, East Orange, N. J., laid at about the same time as Broad Street, Newark, is still good, having no car tracks. The same is true of Mechanic Street, Newark, N. J. There are many other streets where the track areas of pavements have been destroyed, while the same kind of pavement of stone block, asphalt, etc., where no car tracks exist, are still in good condition.

The operation of trolley cars in streets causes dangers and delays other vehicles, so that track areas are relatively little used by the public. Some track areas are paved by the trolley companies with old, second-hand stone blocks which are bumpy, unpleasant, and dangerous to motor and horse traffic and discourage or prevent public traffic from using the track area. Under the best conditions of tracks and pavements between them, the public can make little use of track areas on account of the legal necessity of constantly giving the right of way to trolley cars and in certain cases passing eight feet to the right, thus reducing effective street area and causing additional danger to traffic, all due to trolley cars.

An ever-increasing percentage of the people —now about 30 per cent—do not use trolley cars. These non-users should not be taxed for any street railway expense of paving or otherwise for the benefit of users of trolleys.

Several kinds of very economical pavement are successful on areas of streets away from street-car areas, whereas different and more expensive pavement must be used in track areas. Therefore, the extra expense of pavement in track areas should not be an expense of the taxpayers.

The presence of street cars on the street causes danger to children and people, noise and nuisance to residents and is a detriment in other ways, frequently depreciating the value of residence property on trolley streets. In almost every case where tracks are to be laid in a new street, the residents rise in protest. Yet the proposal [of Bill 37 mentioned at the beginning of this article] is to levy the cost of trolley area pavement and its general repairs upon these same residents.

Many trolley companies have deferred paving or making proper repairs and maintenance to track areas in the past, resulting in dangerous and deplorable conditions. Regardless of future pavement requirements, legislation should not attempt to relieve them from past and existing obligations to pave at their own expense under their charter requirements and by law. Trolley companies should bring existing track pavements up to the full standards of construction and conditions required by their franchises. To attempt by law to do otherwise would be retroactive legislation which would be unconstitutional.

It is not equitable or just that the taxpayers, either by assessment for pavements on streets, or by general taxation in any way, should pay for first construction or repairs or maintenance of pavements within street areas occupied by street-car rails or railway ties or supports under the rails. General repairs in all the track areas in New Jersey, if done at the expense of the municipalities, would add about $2,000,000 to the taxes.

The Suspension Bridge Between Philadelphia and Camden

World's First Suspension Bridge Built in 1816, and Now World's Longest Also Built Near Philadelphia

BACK in 1816, two engineers by the names of White and Hazzard erected the first wire cable suspension bridge in the world. The records of this project say: "This was a foot bridge across the falls of Schuylkill above Philadelphia whose cables were thick wires ⅜

ARCHITECT'S DRAWING OF COMPLETED DELAWARE RIVER BRIDGE, WHICH WILL HAVE A MAIN SPAN 1,750 FEET LONG

inch in diameter, and so a new epoch of development was instituted. The span of the structure was 408 feet. Its cost was $125. A total of one cent was charged for passage and only 8 passengers were allowed upon it at a time." Thus 110 years ago Philadelphia erected the first wire cable suspension bridge in the world, and now it has completed the longest similar structure in the world, spanning the Delaware River and connecting Philadelphia with Camden. This is being officially opened to the public July 4, 1926, 150 years after the signing of the Declaration of Independence.

The Delaware River Bridge is 9,500 feet in length, 135 feet wide, and 385 feet high, and has a suspension span 1,750 feet long. It is, in itself, an outstanding example of the progress of American bridge construction in 150 years, an example of the vastly different conditions existing in 1776 and in 1926. This new Delaware River Bridge excels in every way all previous records in bridge building. Heretofore, the Brooklyn, Williamsburg, and Manhattan bridges, connecting Manhattan Island, New York City, with the boroughs to the east, have held first place in suspension bridge construction. All of these, however, have been eclipsed in almost every dimension by the new Delaware River Bridge.

Instead of being hung by two cables formed with six strands of ⅜-inch wire, the new bridge is suspended by two finely woven steel wire cables 30 inches in diameter, each having 18,666 strands of No. 6 wire. Rather than being limited to 8 foot passengers at a time, the new bridge will accommodate 6,000 automobiles an hour in company with four lines of rail traffic and two 10-foot streams of pedestrians. The live load is calculated at a maximum of 12,000 pounds per lineal foot of bridge, while the structure itself being more than a mile and a half in length, adds enormously to the weight supported by the two cables. The tensile strength of each cable is 223,000 pounds per square inch, or something over 100,000,000 pounds per cable.

All of the wire used in the weaving of these enormous cables if stretched out in a single piece would total 25,100 miles, sufficient to encircle the earth at the equator and have enough left over to reach from New York to Pittsburgh. This wire was wound into large coils at the factory of the Page Steel & Wire Company, the weaving into cables being done on the job. The size of this task is appreciated when one realizes that each cable has 18,666 wires, is 3,540 feet long, and weighs 6,750,000 pounds. The work of laying the strands and spinning the cable had to be performed accurately so that each wire would carry its strain. Ralph Modjeski, Chief Engineer, Delaware River Bridge Commission, stated: "In such work there is always the danger of a wire or two slipping and the accident not being discovered until we come to the squeezing process with the 'traveling spider.' Not one wire, however, has failed to fall into its intended place, and the contractor is to be congratulated on the performance of the work of his wire men. All wires pull together."

The suspender ropes, supplied by the American Cable Company and extending from the two main cables to the floor of the bridge, number 596. The total weight of the suspender ropes and cables is 7,400 tons. The floor which they support is made of steel and reinforced concrete, there being two 10-foot sidewalks, one 57-foot motor drive, two trolley tracks, and two rapid-transit tracks.

Suspension bridges date back to the obscurity of Chinese history. The first mention of suspension bridges is made by Kircherns in his "China Illustrata," published in 1667, wherein he described a suspension bridge consisting of 20 chains which, according to him, had already seen more than a century of service. Among the earliest suspension bridges is the one over the Danube at Budapest, which has a span of 666 feet, and the Clifton Bridge at Bristol, England, having a span of 702 feet. Both of these bridges, however, are of chains. It remained for Philadelphia in 1816 to erect the first wire cable suspension bridge across the falls of Schuylkill, thus ushering in a far-reaching development in bridge construction, and the city now has completed the erection of the Delaware River Bridge, which takes its place as the principal factor in the future growth and development of the two cities of Philadelphila and Camden and their environs.

Cedarburg's Youngest Mayor Third Member of Family to Serve

The double distinction of being the third member of his family to serve as the chief executive of Cedarburg, Wis., and the youngest man ever to hold this office, belongs to this city's new mayor, Adlai S. Horn. Mayor Horn, who has been publisher of the Cedarburg *News* for the last seven years, is now 32 years of age.

The Mayor's grandfather, Fred W. Horn, was the first mayor of Cedarburg, and later an uncle of the present mayor held the office here.

One of the most important tasks facing the new administration is the construction of a new unit of the power-plant at an estimated cost of $65,000, to be financed out of the earnings of the plant.

Municipal Progress in China

By Arthur E. Bostwick
Librarian, St. Louis Public Library

THERE was little in the old China that corresponded to what we call municipal progress, and Chinese cities are still very backward in this respect. The important thing in Chinese civilization is the family, and attention is apt to be concentrated on this to the neglect of the municipality and the larger government units. The family often lives within a walled area like a small city, sometimes several hundred persons strong. Within this area, in the case of wealthy families, are many buildings and beautiful courts, grounds and gardens. For what goes on outside the wall, the householder cares nothing. A dead animal, for instance, may lie on one side of his principal gate for days. He would do nothing towards having it removed, because nothing outside his own territory is a matter of concern to him. Whatever has been done in China toward better streets, public parks and playgrounds, water-works, sewerage, and public educational facilities has been done by a slow change in the old Chinese ideas. In matters of education, this change has been very complete; in other respects, not so much so.

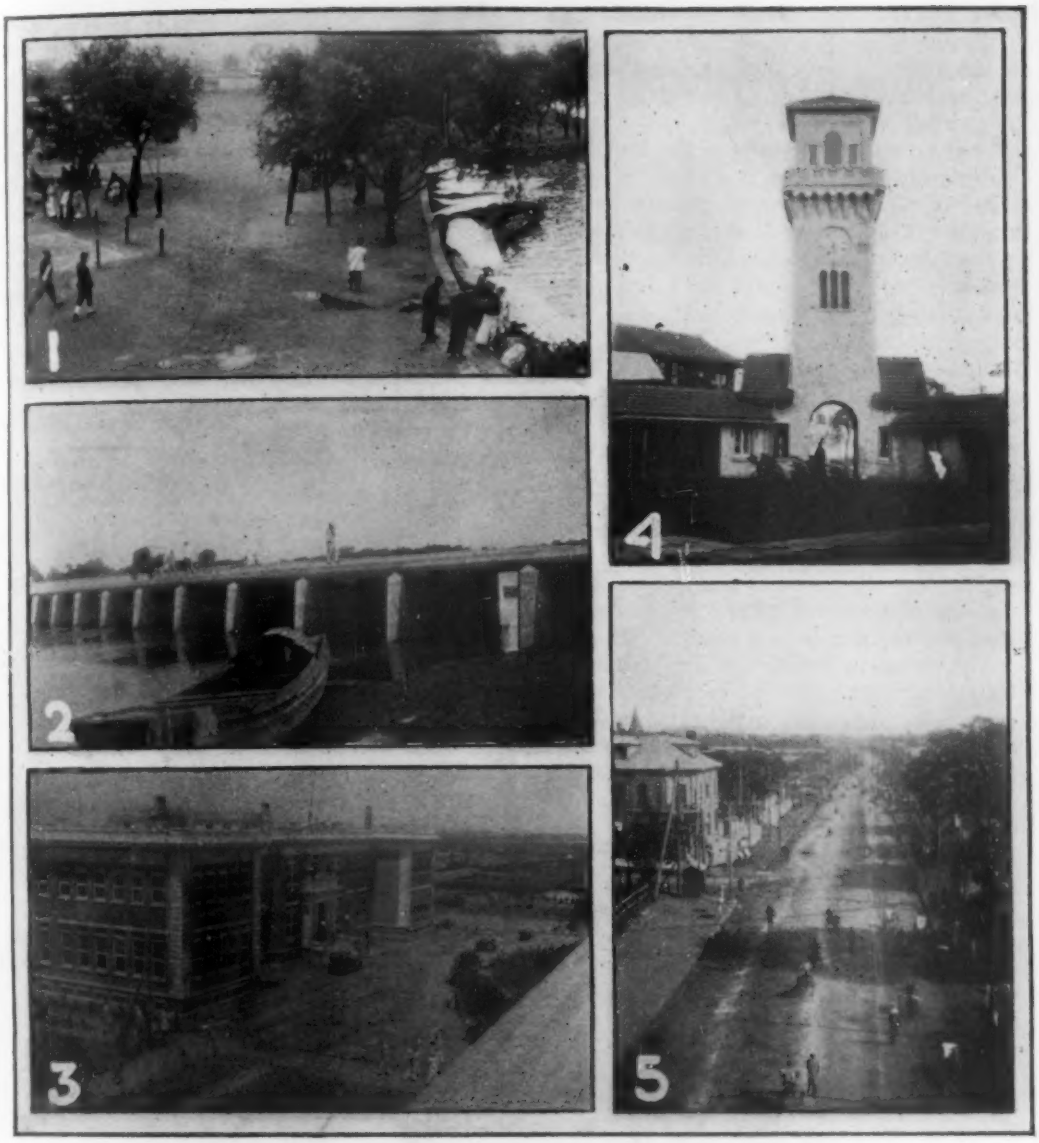
At the so-called Treaty Ports, there are usually settlements of foreigners, originally made for purposes of shipping. The largest of these, and typical of all, is the international municipality at Shanghai. These settlements usually govern themselves; and, although the Chinese are now strenuously objecting to this, the settlements have, in many cases, served as object lessons to them in civic spirit. In Hankow, for instance, that part of the Chinese city immediately adjacent to the foreign sections is not in any way distinguished from them, the streets being broad, well paved, filled with automobiles, and lined with stone structures several stories high.

Broadening the Ways of Communication

This transformation of old Chinese cities, with their narrow alley-like streets and low structures, into modern municipalities by broadening out the ways of communication has extended far inland. In Tai Yuan, for instance, the capital city of the Province of Shansi, the Governor, Yen Hsi Shan, known throughout China as the "Model Governor," has transformed his town, which has no foreign settlement at all, until the conditions there are in many cases European rather than Chinese. The streets are wide, the use of the automobile is general, and fine, hard-surfaced roads run out for a hundred miles or so into the Province in all directions. On some of them are run interurban busses of the latest pattern. When I was in Mukden, Manchuria, this widening of streets was going on there with feverish rapidity. Here there is a large modern Japanese quarter which serves as an example. The Governor of the city, corresponding to our mayor, had just issued a decree that a certain street was to be widened by cutting off six feet from each side; and the street, about a half a mile in length, was filled with workmen carrying out this order by cutting off the fronts of structures, building new ones, and widening the pavement. At the rate at which work was proceeding, it looked as if the whole half-mile would be completed within a week's time. This is an interesting contrast with street-widening proceedings in some of our American cities, which very often drag out for several years. In Mukden there were neither damages nor assessments, and on the whole the property holders were probably better off in the end than they would have been here with our dilatory methods.

The existence of city walls everywhere in China makes possible the creation of great boulevards, precisely as was done in Paris, by the demolition of these walls. It would be a pity to see this done generally, because the walls, with their great bastions and gateways, are picturesque relics of antiquity. The plan has been completely carried out in Changsha, for instance, and the resulting boulevard is a fine one, but, owing to the fact that all the other streets of the city are narrow, there are practically no automobiles and the boulevard is little used.

At West Lake, Hangchow,—which is like a beautiful Adirondack lake with a city of three-fourths of a million along one side, while on the other are mountains filled with ancient pagodas, tombs, temples and residences,—there is a fine wide city boulevard extending the whole length of the lake and lined with large hotels and villas. The lake side of this boulevard has numerous public landings for pleasure boats.



EVIDENCES OF MUNICIPAL PROGRESS IN CHINA

1. Public playground on West Lake, Hangchow. 2. Bridge on road to Chu Fou from railroad station (no parapet); built personally by public-spirited officials. 3. Nan Kai University, Tientsin, showing European style in a Chinese college. 4. Y. M. C. A., Hangchow, showing modern architecture. 5. Hata Men Street, from City Wall, Peking

A Chinese Playground

At one end of this boulevard is the only playground that I saw in China, but it is fully up to our standard. It borders the lake, which it utilizes for water sports, and includes a park building, containing a children's library of three thousand volumes on the upper floor, while on the lower are rooms devoted to the meetings of local societies. I was present here at an evening rehearsal of a musical society, which was very enjoyable. The old Chinese music is quite fascinating.

Peking is the one city in China where there have always been broad streets. These are the great avenues connecting the gates on opposite sides of the city, and there are a considerable number of them. No one knows why this departure from custom was originally made. It was probably due either to military considerations or to an effort to make the emperor's home city look like a great park, which, in fact, much of it is. Outside of these great avenues, the streets are narrow and winding, and they are called "hutungs"—a

designation used nowhere else in China.

I found the old-fashioned Chinese cities much cleaner than I had expected, especially in the business streets. These narrow streets are paved with large heavy blocks of stone extending up to the walls of the buildings on either side and there is therefore no mud. There are also no draught animals, except an occasional donkey, so that the whole street is practically a footpath. This is continually washed by the rains, and what dust there is, is carried off into the canals.

Traffic Regulation in Peking

It is not generally known that the police of Peking are now surpassed by no other police force in the world, and the way in which traffic regulation is carried on is especially interesting. The police are uniformed like soldiers and carry rifles with fixed bayonets. They work in pairs, and the way in which they stand across the street is readily understood as a stop signal. When the traffic changes, they simply face about at right angles.

The streets in Peking are also sprinkled, but by a somewhat primitive method. Two men carry a tub of water and have long-handled coarse brushes. Setting the tub down, they dip the brush in the water and sprinkle it about as far as it will go, after which they move the tub and repeat the operation.

The old Chinese cities had neither water-supply nor sewerage. These are being introduced to a very limited extent, but water and refuse are still in most cases being carried through the streets by coolies in large receptacles. The city refuse is used as fertilizer on the adjacent farms, and to dispose of it as we do by carrying it into a river through sewers would be considered the most extravagant kind of waste.

Streets Brilliantly Lighted

Almost all Chinese cities are now a blaze of light at night. The electric light has simply conquered the Orient. No Chinese shopkeeper, however small his shop or how limited his business, can do without it. The result is that when the shop fronts are down in summer, to ride through the narrow streets in a ricksha after dark, furnishes the most striking and wonderful Oriental pageant that is possible.

As there are practically no regulations regarding electric wiring, this feature will doubtless result in a great increase in fire hazards. In inspecting libraries in China, the first thing that I noticed was that books were stored in such a way that there was great danger of fire. The Chinese comment always was, "You know we have very few fires in China." That was so under old conditions, but it will not, I am afraid, remain so much longer. As it is, several valuable libraries have been destroyed by fire.

The telephone is almost universal and, as far as I could see, was well administered. In our Chinese settlements, as in San Francisco, we require telephone attendants to know both Chinese and English; but even in Peking, where there are so many foreigners, no language but Chinese is understood in the telephone centrals. Foreigners who speak no Chinese must therefore use their servants in telephoning until the connection is made.

Problems of Railroad Location

The advent of railroads introduced a new municipal problem. These improvements were at first violently opposed by all the Chinese, but this feeling has now totally disappeared. In fact, the best-built and best-operated railroad—the Peking-Sui-Yuan Line, which runs northward through Mongolia—was entirely planned and built and is entirely operated by Chinese engineers. The railroads were at first kept as far away from the large cities as possible. In the case of Chu Fou, the headquarters of the Confucian Clan and the burial place of the great sage, the station is now five miles from the city wall, and in nearly all cases railroad stations have been built outside the walls. In the case of Peking, advantage was taken of the brief foreign-government control following the Boxer siege to break openings in the walls of the Chinese city and admit the two railroad lines, from the north and south respectively. But even here, the stations, although they are located in the Chinese city, are outside the great main wall of the Tartar city, or Peking proper. On the whole, the most satisfactory railroad station that I saw in any large Chinese city was the one at Mukden, Manchuria, for which the Japanese are mainly responsible.

Public Parks and Buildings

Private parks were and are numerous in China, as noted above, but few attempts have been made at public pleasure grounds. In Peking, the old Imperial property or parts of it have been turned over to public use, as in the case of Central Park, the Pei Hai, or Winter Palace, and the celebrated Summer Palace of the Empress Dowager, ten miles out at the foot of the Western Hills. To most of these a small admission fee is charged. The new public gardens at Wuchang follow the Peking lead of laying out such grounds in

the Chinese manner, but occasionally European models have been followed with the usual lamentable results. One is told with pride that a public park of this kind is "laid out in the French manner," but it is doubtful whether the French could do otherwise than weep if they saw the result.

Public architecture, sculpture, etc., were formerly equal to any in the world, and examples were frequent in all cities. The state religion was Confucianism and the Confucian temples were always public edifices. Some of these are still well kept up, but others have been allowed to fall into decay. The Imperial Palaces in Peking have been partially turned into museums, which are well maintained, but many of the residential parts are neglected, largely because of the great expense of upkeep. When the old classical education was discarded, the Chinese seemed to think that they must adopt western architecture and equipment to mark the change, and the result has been a considerable number of public buildings and museums in third-class European style. The new government buildings in Peking look as if they might be those of some German provincial city. Foreign institutions have been correcting this tendency by showing that the beautiful old Chinese architecture may be well adapted to modern uses. Such buildings as those of Peking Union Medical College, the new buildings of Yenching University, those of Nanking University and others have demonstrated that Chinese architecture need not be abandoned with the old pseudo-classic education.

Explaining City Planning Through the Movies

By Guy Wilfrid Hayler

PROBABLY the first attempt at the education of the general public to the principles and mission of city planning was made in Chicago in 1915. In that year the Chicago Plan Commission made and exhibited a two-reel picture entitled "A Tale of One City," which covered the rise and development of Chicago and outlined the then new proposals embodied in the famous plan of the late Daniel Hudson Burnham. This proved to be a very effective and successful film and was exhibited to more than sixty theatre audiences in that city, with an attendance of over 150,000 people. It contrasted the planned proposals with existing conditions and was interspersed with scenes of human interest about the city. The first night of showing at the Majestic Theatre was to a capacity house, representative of all the various elements of civic progress.

Making motion pictures of civic improvement schemes and presenting them in vivid contrast with conditions it has sought to eliminate, is not an easy matter. It requires the highest technical skill to combine animated scenes with still pictures and particularly architects' or engineers' plans. Considerable interest is therefore centered in a new photoplay entitled "The Payroll Dollar" which has just been completed by the Alexander Productions of San Francisco, a motion picture producing firm largely specializing in educational films. This photoplay, although based on industrial development and showing the progressive community on one hand with the sluggish one on the other in the matter of encouraging industry, is an important lesson in city planning.

An attempt has been made to depict the complete development of a city through a number of years with consistent application of the principles of city planning throughout. These embrace city zoning, housing in well designed residential tracts, parks and city beautification, civic center and civic architecture, river and water-front improvements, planning of industrial areas, factories, railroad accommodation, etc.

The nucleus of the future city is shown as an early Indian settlement, and the essential needs of food, clothing, shelter, and simple equipment are provided for until in course of time the place becomes a trading post with the arrival of the white man. Trails become roads; wooden shacks become houses, stores and various types of buildings. The public spirit of the town encourages the city beautiful idea, and city plans are made so that all the various elements of the city tie together into one harmonious whole. In essence, the community becomes an industrial center based on ideal conditions and environment.

With the circulation of "The Payroll Dollar" from the factories comes local prosperity, and

MODEL OF CITY BUILT UP GRADUALLY FOR THE MOTION PICTURE PRESENTATION OF CITY PLANNING AND INDUSTRIAL DEVELOPMENT

the play brings out how this money is spent according to the statistics of social research. These show that 35 per cent goes for food, 20 per cent for clothing, 12 per cent for housing, 4 per cent for fuel and light, 6 per cent for furnishings, and 23 per cent for miscellaneous. Into the technical plan of the city is embodied this economic division of the results of industry.

The picture has been filmed in various developing areas of northern California. The foundation of the new city has been accomplished by the ingenious method of constructing it in the form of a model. This covers an area of over 100 square feet and is built of magnesite and plaster of Paris and colored in pastels to give effects of light and shadow. The city is then built up in sight of a motion picture camera and photographed. A remarkable, realistic effect is gained by the fact that the model is constructed true to perspective, a very difficult operation when so many diverse elements are involved. In addition to the model there are a number of technographs or animated charts which show up the reasons for various city features.

Philip W. Alexander has been responsible for this new educational idea, with Al Williams, the well-known miniature-modeler of San Francisco. Throughout they have had the technical assistance of the Regional Plan Association of San Francisco Bay Counties which has placed at their disposal much information on the best city planning methods. The writer supervised this side of the work.

The photo-film has been financed by many leading industrial concerns on the Pacific Coast and it is intended to show the picture throughout the states of California, Oregon, and Washington.

City-County Government Advocated

THE Citizens League of Cleveland, Ohio, in a recent issue of *Greater Cleveland*, advocates, the submission of a constitutional amendment which will permit counties of more than 100,000 population to frame and adopt charters for their own government in which the people of such counties may provide either for the unified and centralized administration of such local functions as the municipalities within a county may delegate to a central authority, or for the consolidation of all local governments within the county into a single government with the consent of the incorporated municipalities.

Explaining the urgent need for the proposed constitutional amendment, the League says:

"The rapid multiplication of local governments in the populous counties of the state, the duplication of administrative functions by these local governments, the inability of local public officials to accomplish needed improvements because of divided authority, and the increasing costs of government, due in part to the wastes of overlapping jurisdiction, make a centralized control, especially of the larger functions of government, absolutely essential to their future economical administration. This, we believe, can be done satisfactorily without sacrificing the advantages of local self-government."

Garbage Disposal in Grand Forks, North Dakota

By J. D. Turner

City Commissioner, Grand Forks, N. Dak.

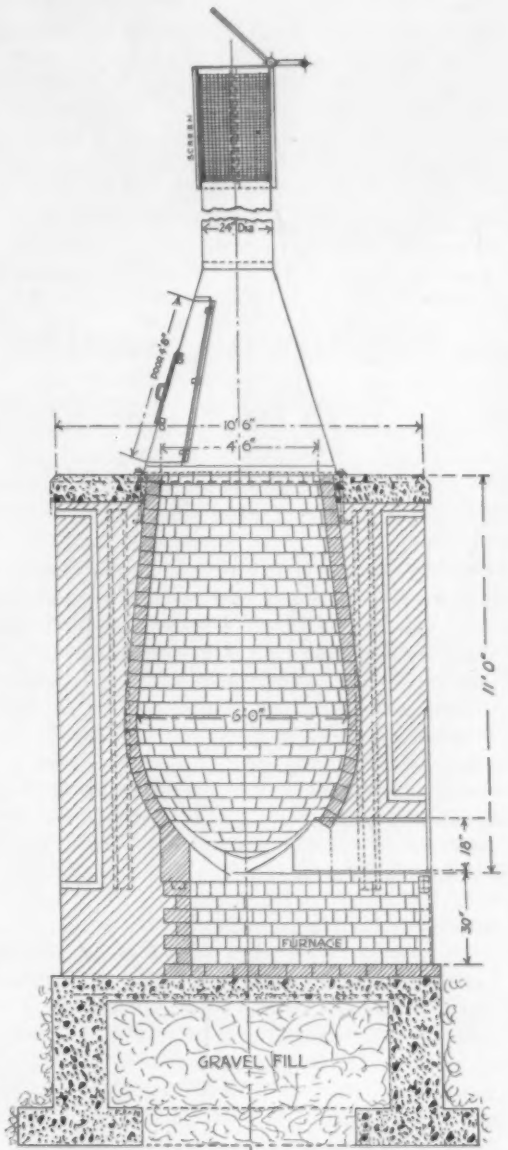
BECAUSE of insistent protests by residents of Grand Forks living in the vicinity of the dumping grounds used for the disposal of garbage and rubbish in August, 1914, the City Council built a unit of the Overson incinerator, for which a contract was let for $1,500. As soon as operation was started, it was seen that one unit would not begin to take care of the city's refuse, therefore two more units were built by the city on force account at a cost of about $1,900. These last two units were built much larger and have taken care of all of the garbage up to the present time.

During the last two years in the hot months there have been times when it has been necessary to have a night man to keep the fires going. As will be noted by the attached report of the operation of the plant for the fiscal year 1925, all garbage has been burned at this plant, including that collected by the city and that which has been hauled by individuals to the plant.

The site for the incinerators was donated and thus the city was saved considerable expense. There has been no complaint of any kind; although the plant is not located in a residence district, there is a house within 500 feet of it, but no nuisance has been reported. Garbage is hauled for about one mile from the edge of the city or the last pick-up. Truck collection has been attempted in Grand Forks, but has not been found successful, as the alleys are very soft in dry weather and, furthermore, two men would be required on the truck.

Great care has been taken to exclude glass from the garbage, as in the incinerator the glass melts and generally sticks to the sides of the incinerators, growing to large masses which when broken off generally take a brick along, causing a rather expensive repair job.

There are several things which we would change if it were necessary to build new incinerators. First, since the furnaces are cone-shaped, they should be built on the side of a hill with a ravine below to facilitate wheeling the cans and ashes. Also, we would make the chimneys about three times as high, and the fire clean-out doors would be made on the order of ordinary furnace doors of cast iron, as the present sliding doors warp out of shape quite readily.



CROSS-SECTION OF GARBAGE INCINERATOR IN USE AT GRAND FORKS, N. DAK.

Tables of cost data appear at the top of the following page.

COSTS OF INCINERATORS, THREE IN NUMBER

First unit, contract G. A. Overson		$1,500.00
Second and third units built by the city on force account, as follows:		
Labor	$437.77	
Lumber	75.35	
Freight	117.97	
Hardware	8.99	
Doors and castings	142.51	
Stacks and equipment	342.50	
Cement, fire-brick and lime	194.92	
Common brick	372.50	
Concrete drain	210.00	
Total cost of two units		$1,902.51
Cost of three units		$3,402.51

OPERATING COSTS FOR 1925–1926

Wood	$817.23	
Repairs on furnaces	204.05	
Moving guy-wires	25.80	
Extra night man	190.40	
Cleaning adjacent land of papers	60.00	
Tools and lumber	11.80	
Pay roll of supt	1,320.00	
Total	$2,629.28	
Interestion $3,402.51 at 4 %. $136.10		
Depreciation on stacks 100.00	236.10	
Total		$2,865.38

GARBAGE COLLECTION COSTS

Payroll of three collectors	$5,040.00	
Extra collector part time	371.60	
	$5,411.60	
Credit on downtown collector	1,050.00	
Net collection expense		$4,361.60
Total cost of incinerators and collection		$7,226.98

DETAILS OF GARBAGE COLLECTION

	Tons
1,915 loads hauled by collectors	1,854
1,881 loads hauled by others	787
18 horses	14
8 cows and 5 calves	8
Total	2,663

Average production of garbage for Grand Forks is 1,000 pounds per day per thousand population for all burnable garbage, counting Sundays.

Average cost of collecting 1,854 tons, $2.35 per ton.

Average cost of burning 2,663 tons, $1.08 per ton.

Average cost of burning and collecting 2,663 tons, including interest and depreciation, $2.71 per ton.

Average cost per day for the city's garbage disposal is $19.79. 112 cords of wood was used at an average cost of $7.25 per cord.

No depreciation is charged on the furnaces, as this is taken care of each year in the repairs that have to be made.

Eighteen Months' Operation of the World's Largest Filtration Plant

By William M. Wallace
Superintendent of Filtration, Detroit, Mich.

THE Detroit filtration plant was formally opened and placed in service on December 21, 1923. It is recognized that this plant has a greater daily filtering capacity than any other plant in the world—from 320 million to 360 million gallons.

In construction the plant has no unusual departures from the general design of other plants, exclusive of the mixing chamber, which is considerably smaller in proportion to the capacity of the plan than those which have been provided in most recent filter installations.

Mixing Chamber

The mixing chamber is 18 feet wide by 240 feet long, and was designed to provide thorough and rapid mixing at high velocities by means of a diversified system of alternate sets of vertical and horizontal baffle walls, so arranged that when the chamber is operating at maximum capacity, the velocity through it is approximately 90 feet per minute, and the mixing period slightly less than 3 minutes. Provision was made for introducing the coagulant, aluminum sulphate, at the initial point of the chamber.

During the first six months of operation close observations were made of the applied water, at the outlet end of the mixing chamber. Coincident with similar conditions in other plants, it was noticed that at indefinite periods there was a decided change in the appearance of the applied water, notwithstanding the apparent constancy of the turbidity of the raw water.

Upon occasion there was decreased efficiency of coagulation, resulting in scanty "floc" formation which tended to give the applied water an opaque appearance. The change in the character of the water was most discernible when the turbidity of the raw water did not exceed 20 p.p.m. A turbidity in excess of that amount decreased the clarity of the applied water to such a degree that it was impossible to make determinations other than by the standard practice of turbidity comparisons.

The appreciable difference in hours of filter service caused by varying factors of coagulation prompted the consideration of changing the point of application of the concentrated solution of aluminum sulphate. In accordance with this decision, a 2½-inch feed line was connected to the discharge of the alum dry feed machines and the flow of chemical solution diverted to the effluent end of the intake tunnel, the discharge end of the chemical feed line being submerged to a depth of 5 feet at the central point of the tunnel.

The possible advantages to be derived from

changing the point of chemical application were the following: the additional travel of approximately 100 feet through the raw-water flume under the low-lift pumps, and the vigorous mixing supplied by the low-lift pumps as the water is discharged into the connecting tunnel between the low-lift pumping-station and the filtration plant, followed by the slower agitation as the water passes through the mixing chamber. Constant observation of the applied water at the outlet end of the mixing chamber, after changing the point of application, did not reveal any apparent difference in flocculation, though the resulting increase in hours of filter service was quite appreciable.

During the months of January, February, and March of each year the turbidity of the Detroit River water rarely exceeds 20 p.p.m., the protective covering of ice preventing serious disturbance of Lake St. Clair by wind or rain. At this season of the year conditions are usually more consistent, relative to turbidity and temperature, than at any other season of the year; therefore, it will be readily understood that a change in the character of the water would not seem to be entirely due to agitation of the lake water, though local river disturbance is responsible for short periods of increased turbidity.

Importance of Longer Mixing Period

As a means of demonstrating the practicability of the longer mixing period, we have occasionally changed back to the original point of application of the chemical solution, whereupon, following the usual period of setting, there was a marked decrease in hours of filter service. Convinced of the desirability of a longer mixing period, we have made provision for a permanent installation to convey the chemical solution to the initial point of entrance of the river water.

The relationship between turbidity, rate of filtration, and filter service is an important factor in the operation of a mechanical or rapid sand filtration plant. In the Detroit plant, as in other plants, the length of time a filter will remain in service is governed by the character and quantity of suspended matter in the raw water, efficiency of coagulation, and rate of filtration. When the turbidity of the raw water is unusually low, it is generally found that, owing to the presence of organic colloids and the very finely divided state of the suspended particles, coagulation is retarded and sedimentation proportionately decreased by the formation of fine "floc," which has relatively low attraction for the foreign matter contained in the water. This condition often prevails in the Detroit plant, particularly during the winter months, when the temperature of the water is but slightly above the freezing point.

In the event of unusually low air temperatures there is a very decided increase in water consumption, prompted by the precautionary practice of the consumers in wasting water to prevent frozen water lines with the attendant expense of repairs. On these occasions the rate of filtration must be increased to meet the water demand. In extremely cold weather this increase will be approximately from 8 to 10 per cent.

During the year 1925 the periodical changes in rate of filtration, occasioned by seasonal demand, varied from a minimum rate of 125 m.g.d. per acre to a maximum of 175 m.g.d. per acre.

Effect of Limited Filtered Water Storage on Filter Operation

The limited storage capacity of the filtered-water reservoir, which does not exceed, from the filter plant operating standpoint, more than 15 million gallons—less than two hours' normal supply—prohibits operation at a uniformly low rate for any considerable length of time. On the contrary, it is necessary to keep the filters set at a sufficiently high rate to meet peak loads during certain hours of the day, cutting out or placing filters in service with the fluctuating pumpage. The result is that during most of the 24-hour day only part of the 80 available filters are in actual service and at a higher rate setting than would be needed if it were not necessary to filter water at approximately the same rate at which it is being pumped into the distribution system. To illustrate this point: At 12 noon on June 25, 1925, 75 filters were being operated at the rate of 166 m.g.d. per acre to meet a peak load of 312 m.g.d. At 12 midnight only 45 filters were in service (at the same rate) to carry a load of 187 m.g.d. The total water filtered on that date was 264.6 million gallons.

The foregoing example indicates an important disadvantage we have had to contend with in the operation of the plant, and no relief from this condition will be afforded until an additional reserve of filtered water has been provided. In this connection, the Detroit Department of Water Supply has made provision for the construction of a second filtered-water reservoir with a capacity of 20 million gallons. This reservoir will be situated immediately north of the existing filtration plant, and the combined available supply from the two reservoirs will total 55 million gallons, or 5½ hours' supply at present normal rates.

Economies Effected by Additional Storage

The additional reserve of filtered water will enable us to operate the plant at an approximate rate of from 125 to 140 m.g.d. per acre, or 3.0 to 3.5 m.g.d. per filter, which will be of great benefit, inasmuch as it will permit a desirable increase in the period of coagulation and sedimentation, which in turn will result in longer filter runs, the use of considerably less wash water, and increased bacterial efficiency of the filters.

In regard to the latter condition, it is universally recognized that a low rate of filtration is most desirable. In the Detroit plant it is often necessary to increase the rate of filtration in order to provide sufficient water to meet demand. The undesirability of increasing the rate of filtration when the filters have been in service for some hours, is well understood. Yet, owing to the limits of operation we are compelled to make these changes.

Our records of operation offer conclusive evidence of the value of low filtration rates, from the standpoint of bacteriological efficiency and increased filter service. During the months when the rate of filtration does not exceed 134 m.g.d. per acre, and the turbidity of the raw water is not less than 35 p.p.m., there is an appreciable increase in filter service and in the bacterial reduction of the filtered water, though a counter effect results from operating at the rates which prevailed during the months of July and August, 1925, namely, 166.3 and 165.8 m.g.d. per acre respectively.

The percentage of decrease in bacterial efficiency of the filters, after increasing the rate of filtration, is largely influenced by the condition of the river water. A turbid water, containing numerous bacteria, will show a higher percentage of decreased bacterial efficiency of the filters than a water containing a relatively low number of bacteria and a small amount of turbid matter. To counteract the possible harmful effects of operating at the higher rates, a slight increase of chlorin solution is applied to the water, usually ¼-pound in excess of normal dosage.

Studies of Sedimentation

Efficiency of coagulation and sedimentation is essentially important in the process of filtering a water-supply. There are two coagulation basins in the Detroit plant, each of 15 million gallons capacity. These basins were designed to provide a subsidence period of more than two hours when the whole plant is operated at its maximum rate. From observations made, the reader believes that a period of sedimentation of less than two hours is impractical in the treatment of the Detroit River water.

To determine the efficiency of the west coagulation basin in regard to flow and time of retention, studies were made of the currents, by means of surface and depth floats, in 1925. This basin is 505 feet long by 240 feet wide and 16 feet deep, and is of the around-the-end type. The applied water is admitted from the mixing chamber through a submerged sluicegate, 8½ feet by 14 feet in size. After entering the basin, the water flows against a perforated baffle wall which serves as a distributor. This wall sits on an angle of 12½ degrees.

The current studies, which supplemented preliminary investigations conducted in 1924, showed that peculiar currents and eddies are created throughout the basin. In some locations of the basin it was found that velocities were four times the average; in others, no flow was discovered.

To augment these studies and to endeavor to discover some new facts in relation to basin dispersion, a model coagulation basin was constructed which is a prototype, at a scale of 1 to 20, of the west coagulation basin. This model basin was operated at various rates of flow until a rate of flow corresponding in physical characteristics to the flow through the large basin was obtained. After determining this flow, several schemes to improve the general flow of water through the basin were experimentally tried. Briefly, these schemes were as follows: an inclined baffle was installed and used in various positions; screens of different mesh were placed in varying positions, and changes of flow determined; a perforated baffle or stilling basin and submerged weirs were also experimented with and the resulting changes carefully noted.

The various tests for current variations were made with surface and submerged floats and color clouds. The obtained results were charted on a system of coordination at one-minute intervals, locations of extreme eddying and dead corners being charted. Dispersion was also determined by dosing with sodium chloride.

These experiments have not been concluded, and other methods of determining the most efficient means of controlling the flow and dispersion of the water in the west coagulation basin will be tried until the most practical control has been definitely determined.

Admittedly, conditions of flow in the coagulation basins are not entirely satisfactory, and the adopted method of future control should have the effect of prolonging the period of retention, which at the present time of operation is con-

siderably less than the capacity of the basins would indicate.

These points are purposely stressed because of their close relationship to the general principles of filtration practice.

Filter Beds

In the Detroit plant there are 80 filter units, each having an effective sand area of 1,088 square feet. The filters are divided into five double rows of eight beds with a pipe gallery between each two rows, the operating floor forming the cover for the pipe galleries. Each bed is 1/40 of an acre and has a filtering capacity of 4 million gallons at 160-million-gallon rate or 4½ million gallons at 180-million-gallon rate.

The filtering medium consists of 17 inches of gravel placed around and above the strainer system in even layers varying in size from 2 inches at the bottom to 1/16-inch at the top, and 30 inches of sand having an effective size of 0.45-m.m. and a uniformity coefficient of 1.5.

When the plant was first placed in service, the depth of sand in each filter did not exceed 24 inches. After two months of operation, during which time regular inspection of the beds was made, it was discovered that "mud balls" were much in evidence in each bed.

The problem of disposing of the mud balls in eighty large filter units was one which caused some concern and involved careful consideration of the method to be pursued, so that the operation would be effectively and economically fulfilled.

The old method of removal by screening was considered impractical, therefore it was deemed advisable to construct or assemble a mechanical appliance capable of a wide range of operation, in a local sense.

After a brief period of experimental work we procured two 350-r.p.m. portable electric drills, to each of which we assembled the following parts: one 6-foot length of ¾-inch steel shaft, one 10-inch right propeller, and one 10-inch left propeller; the blades of the propellers had a 15-inch pitch and were spaced 12 inches apart at the end of the steel shaft.

In preparation for treatment of the sand a portable platform was placed over the wash-water troughs, which permitted the sand to be treated in a 1/16-section of the bed without making further changes.

Prior to commencing the actual operation of sand treatment, the wash-water valve was partly opened and the sand driven into suspension, thus reducing the frictional resistance of the sand to a minimum. The shaft, with propeller blades attached, was then submerged to the required depth and the sand was subjected to a vigorous agitation, created by the reverse action of the two propellers.

The initial operations were carefully observed, inspections being made quite frequently to make certain that there was no unusual disturbance of the finer gravel.

The results obtained from this method of mud ball treatment fully justified its continuance until the contributory causes of mud ball formation had been eliminated.

The cost of sand treatment did not exceed $20 per bed, this amount being inclusive of labor, wash water used, and depreciation of equipment.

Causes of Mud Balls

Mention having been made of the forming of mud balls in the filter beds, it is important that an opinion be expressed as to the possible cause of this undesirable condition. As formerly stated, the original depth of sand did not exceed 24 inches in each bed. With this depth of sand, the distance from the level of the sand to the crest of the wash-water troughs was 36 inches.

After a short period of operation, it was found that the surface of the sand was becoming heavily laden with very fine silt, which could be attributed to no other cause than the partial ineffectiveness of the wash water, occasioned by the unusual distance which the surface silt had to be raised before being discharged into the wash-water troughs.

The constantly increasing accumulation of surface silt necessitated scraping off a light layer of surface sand at altogether too frequent intervals.

Air-Binding of Filters

In addition to the foregoing difficulties, we developed an air condition in the filters which seriously interfered with their operation and was a primary factor in the development of mud balls.

In the months of March and April, 1924, there was a decided falling-off in filter service, due to the character of the water then being treated, the length of the filter runs being reduced to less than 4 hours. In many instances, the decrease in filter service periods was accompanied by a complete air-binding of the filters, which, for a brief time, threatened to curtail the general supply of filtered water.

The most harmful effects of the air-binding were experienced in the washing of the filters. It is our practice to crack the wash-water valve at the beginning of the wash, and after the sand surface has broken evenly, gradually bring

the wash water to the desired rate. This method of operation was useless when washing an air-bound filter, inasmuch as it was required to open the wash-water valve two or three points before air displacement became effective. Notwithstanding the practice of every precaution, there were violent sand eruptions during the washing of the filters, which tended to thoroughly mix the surface silt with the general body of the sand. Close observations following the washing of the filters indicated that mud balls were the result of these abnormal conditions.

At a later time it was determined that air-binding of the filters was a mechanical difficulty, which was overcome by making additional pipe installations to prevent pocketing of air in the mercury wells and in the effluent pipe line when the filters were drained for washing.

As a means of preventing the accumulation of silt on the sand surface, sufficient sand was applied to each bed to decrease the distance from the surface of the sand to the crest of the wash-water trough from 36 inches to 26 inches. Since the application of additional sand there has been no recurrence of mud balls.

Sewage Pump and Station

During the past year the construction of a sewage pump and pumping-station was completed. This building houses an American Well Works vertical pump with a capacity of 13,000 gallons per minute. The pump is driven by a General Electric 75-h.p. motor. All sewer lines from the filtration plant, low-lift pumping-station, and adjoining catch-basins feed into the sewage sump, from which the sewage is pumped into the Detroit River.

Independent Supply of Wash Water

The existing source of wash-water supply is direct pumpage from the water-mains. The irregularity of pumpage, caused by the spasmodic filling of the water-tanks during the washing of the filters, made it almost impossible to maintain constant pressure in the water-mains from which the filtration plant is drawing its supply of wash water. To provide against the difficulties of operation from this source, an independent supply of wash water is being arranged. Under the changed conditions the wash water will be pumped direct from the filtered water flume, into which the filters on No. 2 gallery are discharging, thus eliminating the supply from the city main, with its attendant troubles.

The installation of a vertical pump, with a capacity of 12,000 gallons per minute, is nearly completed. This pump will be driven by a 250-h.p., 585-r.p.m. General Electric motor. When placed in service, the pump will furnish sufficient wash water to meet all conditions of filter operation.

Personnel

The complete personnel of the Detroit filtration plant consists of the Chief Chemist and Superintendent, one bacteriologist, four junior chemists, one laboratory assistant, one stenographer, one filter foreman, eleven filter operators, and eighteen utility men. One junior chemist is on duty on each shift.

There are three filter operators on each shift of eight hours. These men work in rotating shifts of four weeks each. The operators are required to work 48 hours per week, provision being made for one relief day in each seven days.

ACKNOWLEDGMENT.—From a paper read before the Annual Convention of the American Water Works Association, at Buffalo, N. Y., 1926.

New Grass May Save Highway Shoulders

THE maintenance division of the Minnesota Highway Department is experimenting with creeping bent grass in an effort to reduce cost of shoulder maintenance and prevent deterioration of graded highways. If creeping bent comes up to expectations, a big step will have been made in the solution of this problem.

Experiments with bent grasses were begun ten years ago by experts in the U. S. Department of Agriculture. It was first tried for putting greens for golf courses and later for lawns. It was only recently that anyone thought of the possibilities of its use as a binder for highway shoulders. The Minnesota Highway Department has six small experimental plots which W. F. Rosenwald, Chief Maintenance Engineer, is watching with intense interest.

Creeping bent is said to form a mat of grass so thick that it will kill all other vegetation. The grass is propagated by scattering clippings and harrowing them into the top soil. In a few weeks, according to men who have seen the grass grow, there will be a growth of short grass as dense as a cocoa door mat. This is expected not only to prevent washouts on the highway shoulders but to eliminate the expense of mowing grass and weeds.

A single shoot of the bent grass, if it takes root, is said to develop a mat three or four feet in diameter in the course of one summer, and a square yard of sod when shredded will furnish the foundation for a good-sized lawn.

The danger of introducing a pest worse than quack grass was considered before any plantings were made by the Minnesota Highway Department, but it was ascertained that, unlike quack grass, creeping bent is quickly killed by cultivation. The annual plowing will destroy any of the bent grass that may have strayed into nearby fields.

Experiences with Separate Sludge Digestion

By L. R. Howson

Alvord, Burdick & Howson, Consulting Engineers, Chicago

THIS discussion is a brief résumé of the operation of three or four of the separate sludge digestion plants with which the writer has personally been in contact. Among the largest plants of this type in this country, aside from the one in Baltimore, Md., are those at Madison, Wis., Lincoln, Nebr., and Great Lakes, Ill. A smaller plant of recent construction at Hartford, Wis., has some rather unusual features in connection with its design and operation.

Madison, Wis.

The Madison, Wis., plant was designed in 1914. It consists of hopper - bottom settling tanks in two compartments, primary and secondary, having a combined detention period of 2¼ hours at the designed capacity of 5,000,000 gallons per day. The effluent from these tanks passes to so - called colloidal tanks whose capacity is now being largely utilized for sludge digestion, thence to contact dosing chambers and stone sprinkling filter beds. Separate sludge digestion storage capacity is provided in hopper-bottom tanks in amount equivalent to 1.3 cubic feet per capita as the plant is now operating.

The tanks were designed with the hopper bottoms sloping at 45 degrees, but difficulties with quicksand encountered in the construction led to the flattening of these slopes to only approximately 17 degrees with the horizontal. This flattening of the slopes resulted in the inability to draw sludge completely from the settling tanks to the digestion tanks, with the result that a part of the sludge remained in the bottoms, became septic and interfered with the successful operation of the tanks. A few years later a part of the tank capacity was sacrificed, and hopper bottoms were built inside the existing tanks so as to secure the slope necessary to the complete withdrawal of the sludge.

All tanks are now equipped with a flexible system of piping connected to pumps by which sludge may be withdrawn from any of the primary, secondary, and colloidal settling tanks into any of the sludge digestion compartments. This permits a maximum utilization of capacity and results in securing the most uniform sludge.

The cycle of operations at Madison has been changed from time to time to best meet the greatly increased load. At the present time the sewage plant, which was designed to handle domestic sewage at a rate of approximately 5 million gallons per day, is carrying about a 10 per cent overload of domestic sewage and in addition a strong packing-house waste, which, expressed in pounds of animals slaughtered per capita contributing sewage at Madison, is greater than the waste of the packing plants in Chicago expressed in terms of Chicago's population.

One of the principal changes in operation has been toward the more frequent removal of sludge and scum from the settling tanks to

Separate Sludge Digestion Successful

In this article, outlining experiences at three or four different sewage treatment plants, L. R. Howson has drawn some very definite conclusions regarding the success of the system. He states that separate sludge digestion tanks have demonstrated their ability to accomplish efficient clarification and sludge reduction and to produce a good sludge which can be readily dried. It is necessary, however, to have adequate sludge digestion capacity with any type of tank. In difficult excavation, such as quicksand or rock, tanks of the separate sludge digestion type may be built at less cost than those of the two-story type. Further, the separate sludge digestion type of tank is flexible in that the first construction does not limit the relation between settling and sludge storage capacity. It is possible that the digestion of sludge in separate sludge digestion plants may be speeded up by applying heat artificially and sludge storage capacity correspondingly reduced. The efficiency of these plants, as of all others, depends as much upon the operator as the designer.

the digestion tanks. As at present operated, sludge is drawn from the primary tanks twice a day, from the secondary tanks once every three days, and from those colloidal tanks which are still used for sewage settling, approximately twice a month. The Madison tanks, according to the available data, are effecting a reduction in settleable solids of 98.1 per cent, a reduction in total suspended solids (based upon a three months' record) of 81 per cent and a reduction in the 5-day biochemical oxygen demand value of 34 per cent.

The efficiency of the tanks is further indicated by the fact that there is practically no nozzle clogging, the operator advising that approximately ten nozzles per week, or 1.25 per cent of the total number, are all that require cleaning, and further, that there has been very little pooling of the stone filters at any time, even though the top 18 inches of the filters is composed of limestone ranging in size from ¼- to ¾-inch, and the filters are taking a load equivalent to 3,500 people per acre-foot plus a concentrated packing-house waste, as before stated.

The sludge digestion is such that with a total sludge storage of 1.3 cubic feet per capita and drying beds of 0.84 square feet per capita no difficulty is experienced in handling the sludge.

The total cost of disposal at Madison for the year 1924 was $11,660, the equivalent of 24 cents per capita, or $5.34 per million gallons.

There are no odors about the plant. Trouble from odors was experienced at one time because of the lagooning of sludge in too fresh a condition. All sludge was lagooned until about two years ago, when one acre of sludge beds was provided. The sludge dries readily and is of first-class quality.

The Madison plant has been operated under the direction of James Mackin, who also operated the plant preceding the one described herein. It is largely due to Mr. Mackin's ability and ingenuity that the plant has been able to secure excellent results with the heavy overloadings under which it has been required to operate for some years.

Lincoln, Nebr.

At Lincoln, Nebr., a separate sludge digestion type plant was built in 1923. At the present time the tributary population of 63,000 contributes a sewage flow of approximately 4 million gallons per day of concentrated strictly domestic sewage. The sewage averages 299 p.p.m. total solids.

The sewage reaches the plant practically devoid of dissolved oxygen. As at Madison, all sewage is pumped, and the solids are finely divided.

This plant consists of six settling tanks, each 27 feet square with a maximum depth of 24 feet. The detention period in the tanks at a 4,000,000-gallon rate is 3.08 hours.

Sludge digestion capacity equivalent to 1.00 cubic foot per capita of contributing population is provided. The sludge bed area is equivalent to 0.64 square feet per capita.

The sprinkling filters are 2.8 acres in area and average 6 feet, 3 inches in depth, giving a loading of 3,600 people per acre-foot depth, or 1,500,000 gallons of liquid per acre per day.

In the early periods of operation of this plant some odors were experienced. It was found that these odors resulted from the operation of the pumps in such a manner that the large intercepting sewer coming to the plant served as a storage reservoir during hours of peak flow. The pumping program was changed so as to keep this sewer pumped down at all times, and this has resulted in practically eliminating all trouble from the odors.

At Lincoln the sewage is largely scum-forming rather than sludge-forming. Considerable experimenting has been done to ascertain the best procedure relative to the withdrawal of scum and sludge from the settling tanks to the digestion chambers. Periods of withdrawal varying from once a week to daily have been tried, and the operator's conclusion at the present time is that withdrawal every third day seems to work most satisfactorily.

The sludge at Lincoln, as at Madison, is of very good quality. A number of moisture determinations have been made of the sludge as applied to the beds; these vary from a minimum of 82 per cent moisture to a maximum of 89 per cent, with the average of 86.2 per cent, thus indicating a satisfactory consistency of the sludge. The sludge dries readily, has the customary earthy odor, is porous and of a uniform brown color throughout.

The sludge digestion tanks were provided with means for the withdrawal of the liquid between the sludge and the scum, but the fact that so large a part of the Lincoln sludge tends to float has made it more or less difficult to accomplish the desired results with the piping as installed. It is believed that this piping should be provided with multiple openings not less than 4 inches in diameter or the same result accomplished by flexible piping connections which may be raised or lowered in order

to withdraw the liquid and thus secure the fullest utilization of the digestion capacity. The liquor withdrawn is returned to the pump suction well and thence goes through the plant again as sewage.

Sprinkling filters have been operating satisfactorily, although some slight pooling has been experienced. The final effluent from the plant, which is the effluent from the sprinkling filters, as there is no secondary sedimentation, is of high character, averaging stability of 16 days, or 97 per cent.

The cost of sewage disposal plant operation at Lincoln for 1924 averaged $6.60 per million gallons and 15.3 cents per capita served.

Great Lakes, Ill.

At Great Lakes, Ill., a separate digestion type of tank plant was built in 1917 for the Naval Training Station. The plant was designed for war use and for 30,000 men. Almost by the time the plant was constructed, 55,000 men were connected to it. The plant consists of primary and secondary settling tanks having a combined period of 2 1/6 hours at rated capacity of 3,000,000 gallons per day. Sludge storage equivalent to 1.2 cubic feet per capita, based on 30,000 people, was provided.

The tank effluent passed to a mixing tank and a sedimentation basin, thence to a mechanical filtration plant of the water-works type, but designed to operate at three-fourths of water-works rating, or 1½ gallons per minute per square foot.

The plant was put in operation in November, 1917, just as cold weather was coming on. The entire training camp, except the permanent brick buildings, was built with a non-return steam heating system, with the exhaust going directly to the sewers, so that the colder the weather, the hotter the sewage. During the first winter the sewage frequently got as high as 95 to 98 degrees Fahrenheit. This condition, so far as the writer's knowledge is concerned, was unprecedented.

The sewage was also exceedingly fresh. The plant is located within 200 feet of officers' residences and the hospital. The time of flow in the sewers varied from a couple of minutes to a maximum of 45 minutes. The sewage all came to the plant by gravity, was unusually coarse, and was accordingly floating and scum forming. Scum formed over the primary settling tanks at the rate of about 6 inches thickness per day at times of peak flow. The period of flow through the tanks averaged less than an hour and a half and at the peak rates was only 45 minutes. The high temperature made the ebullition of gas and the digestion of the sludge exceedingly rapid, which tended to offset the great overload which the plant was required to take almost from the beginning.

When the tanks were first placed in operation, some difficulties were experienced from coarse, and was accordingly floating and scum hydgogen sulphide. After the digestion processes had become established, the odors disappeared and the plant has been substantially free from odors since. The plant is still operating, although designed for the war period. It is believed that the best evidence as to the ability of the plant to operate free from nuisance is the fact that it is located within 200 or 300 feet of the medical department officers' quarters and directly in line with the prevailing winds toward those quarters—surely a severe test of odors from a sewage treatment plant.

The effluent at this plant is given final treatment through mechanical filters of a water-works type, which are operated without the use of coagulant. The length of filter runs between washings is approximately 8 hours. The effluent is clear and uniformly stable for a period in excess of ten days, and in appearance is substantially equal to the effluent from intermittent sand filters.

At present the sewage is very dilute, averaging about 1,500,000 gallons per day with a contributing population of about 2,000.

The liquor between the sludge and the scum in the digestion chamber is periodically drawn to a low-level reservoir into which the filter wash water also discharges, both being pumped back to pass through the settling tanks as sewage. Sludge can be withdrawn only through the pipe at the bottom of the digestion tank hopper. No sludge has been withdrawn for over two years, and at the present time approximately 10,000 cubic feet of sludge and scum is in the digestion chamber, that is, about one-third of the sludge storage capacity.

Hartford, Wis.

At Hartford, Wis., a separate sludge digestion tank plant was built in 1924. The plant has now been in operation a little over a year. It consists of two tanks, one a settling fank and the other a sludge digestion tank, each equipped with Dorr clarifier mechanism.

The plant does not have the benefit of laboratory control, but some infrequent observations have been made by Frank Bachman, of the Dorr Company. These observations have been checked visually by a visit to the plant.

The settling tank, having a storage period

of approximately 2½ hours, is provided with a Dorr clarifier mechanism which operates continuously at slow speed. Sludge is pumped twice a day for about one hour at each pumping. There is no scum on the settling tank, and no bubbles are visible. Visually, the clarification seems to be entirely satisfactory.

The digestion tank has a storage capacity equivalent to 3.07 cubic feet per capita. Sludge beds equivalent to 0.58 square foot per capita are available. The digestion tank operates free from odor and produces an excellent sludge. The revolving mechanism in the digestor is operated only about 2 hours each day and at a speed of 3 revolutions per hour. Both the scum and the sludge are agitated.

The sludge dries readily, is porous and spongy, and has all the characteristics of a properly well-digested sludge. No odors are apparent.

Conclusions

From observations of the construction and operation of these plants and a comparison with other plants of other types, it is believed some general conclusions may be drawn, as follows:

1. Separate sludge digestion tanks have demonstrated their ability to accomplish efficient clarification and sludge reduction and to produce a good sludge which can be readily dried.

2. Adequate sludge digestion capacity is needed with any type of tank. The separate sludge digestion type of tank, by having its entire sludge capacity available through the withdrawal of the liquor lying between the sludge and scum layers, can probably be built with somewhat less total sludge digestion capacity than tanks of the two-story type where the withdrawal of the liquor is not practicable.

3. In difficult excavation, such as quicksand or rock, tanks of the separate sludge digestion type can be built at less cost than those of the two-story type. The construction of shallow settling tanks and the pumping of the sludge *only* to a deep sludge digestion tank located with its flow level at a higher elevation may result either in the saving of great construction costs, or obviate the necessity of pumping the *entire* sewage flow, as would be necessary with a two-story tank.

4. The separate sludge digestion type of tank is flexible in that the first construction does not limit the relation between settling and sludge storage capacity. Either may be enlarged without the expense incident to enlarging both. It would seem, further, that separate sludge digestion probably offers an economical means of caring for part of the sludge in some plants of the two-story type in which the sludge capacity has been found deficient, but the flow capacity adequate.

5. It is possible that the digestion of sludge in separate sludge digestion plants may be speeded up by applying heat artificially ,and the sludge storage capacity correspondingly reduced. This procedure has been suggested for experimental observation at the Lincoln plant.

6. The efficiency of separate sludge digestion tank plants, as of all others, depends as much upon the operator as the designer. Plants of this type may require even more intelligent operation than plants of the two-story type.

7. With sludge digestion tanks of the separate type, it is possible to mix the sludge by pumping, as at Madison, or by mechanical agitators, as at Hartford, and thus facilitate uniform and more complete digestion.

It is the writer's opinion that the difficulties experienced with separate sludge digestion have largely arisen from the intermittency and incompleteness of sludge removal from the settling to the digestion tanks. It is believed that the installation of mechanical means to accomplish this more readily and more positively will become more prevalent in the future.

It has been the writer's effort to point out some of the operating difficulties as well as advantages of separate sludge digestion. So far as he knows, no means of separating sewage solids from the liquid and reducing them to an inoffensive condition has been entirely free from operating difficulties.

ACKNOWLEDGMENT.—From a paper read before the American Society for Municipal Improvements.

MASSACHUSETTS MUNICIPALITIES MAY BUY LAND FOR PARKING

Municipalities in Massachusetts can now borrow money for acquiring land to use as public parking places. The Boston Chamber of Commerce calls attention to the fact that the 1926 legislature has passed an act authorizing cities and towns to incur debts for this purpose, if and when they wish to do so.

Asphalt Macadam in New York and New England—Part I

By V. L. Ostrander

PENETRATION ASPHALT MACADAM ROAD READY FOR APPLICATION OF ASPHALT

ONE-HALF of all the bituminous macadam in the United States is found in New York and New England. The combined mileage of this type on all of the state systems of this country is approximately 9,000 miles, while over 5,500 miles are in this group of states, with over 4,000 miles in New York State alone. The cities of the whole nation show some 33 million yards of the type. New York and New England cities have over 16 million yards of this total. These figures do not include waterbound macadams, with or without bituminous surface treatments, but include only the bituminous-bound macadam built by the penetration method. While exact figures are not available to show the proportions of asphalt macadam and macadams bound with other bituminous materials, it is not an exaggeration to say that the asphalt types bear a ratio of ten to one in past construction, and even greater in present practice.

It is looked upon with nearly as great favor for a large percentage of city streets as on the open highways. It admirably serves the early pavement needs of those streets which require a surfacing but upon which traffic has not yet become so intense as to justify a more expensive type. In Boston 55 per cent of all the streets better than gravel are some form of macadam. Springfield, Mass., shows the same percentage—55. Providence shows 70 per cent; Portland, Me., 39 per cent; New Haven, 33 per cent, and New York City, 17 per cent. In these cities where some of the older macadam had not originally a bituminous binder, it has in practically every case been treated with bituminous surfacings. Present practice in macadam is the bituminous penetration type exclusively.

When asphalt macadam first came into use on a scale worthy of mention along about 1908 to 1910, New England and New York had for many years been placing waterbound macadam rather extensively. They had thus been initiated into many of the fine points necessary to be observed to secure durable pavements with a long, smooth life, so that a considerable degree of success was attained from the very beginning. That this is true is best attested by the fact that many miles of these earlier penetration asphalt macadams, built in the years 1909-1910-1911, are still carrying their original surface, even though they were designed with extremely light foundations, as

ASPHALTIC PENETRATION MACADAM WITH A COVERING OF STONE CHIPS IN THE FOREGROUND; ROLLER AT WORK IN THE BACKGROUND

This road in Westchester County, near Bedford, N. Y., is a 10 per cent grade. The coat of 2 gallons per square yard was put on in one application and there was no seal coat

we would consider them today.

In New York State, of the 9,800 mileage of paved roads already built on the state system, a great framework of over 4,000 miles is asphalt macadam, largely with its original surfacing, and with an average age of ten years. This means that some of these roads are fourteen or fifteen years old. This age would not be considered remarkable for pavements built under modern specifications, but I recall that at the time these roads were built, the usual base placed under them was only a 3-inch or 4-inch thickness of broken stone, and motor trucks were non-existent. They were placed on new road-beds which had never before been metaled. Their extent is so great as to cover all kinds of soil and drainage conditions.

Construction

Present foundation practice in this section seems to be fairly uniform among the various states. As a rule, in entirely new construction, a foundation course of 8- to 10-inch depth of sledged stone or telford is placed by hand and filled with a good grade of gravel or broken stone. Every effort is made to secure a smooth, true surface, with voids well filled. Sand or cinder blankets are growing in favor over soft subsoils to prevent the separation of the stones of this course through the working-up of soft materials into the course. Where careful attention has been paid to occasional pockets of soft or spongy material, failures have been practically eliminated. Under especially unfavorable conditions the foundation depth is frequently increased to 12 inches and usually placed in two courses. Frequently the additional bearing power is secured through the use of a subfoundation of selected gravel in localities where suitable material is available.

The accepted present practice is to place over this foundation a 2- or 2½-inch course of broken stone, to insure permanent filling of the voids in the foundation, to give a greater uniformity of surface to receive the penetration course, and to add strength to the section through the use of a small quantity of material most valuable for this purpose. The depth and sizes of stone for this course are varied to suit the particular conditions of the project, the intention being to use all the crushed product not required in the other course. Where the stone is not crushed locally, 2½ to 1½ size is generally used. The voids are filled with stone dust, clean sand, or fine gravel. An excess of filler is not desirable and, in fact, better results are obtained where the stone of this course is exposed for about one-half inch. The filler should be dry when applied and should be put on in several light applications to insure a proper sifting-down into the lower voids.

A thorough rolling of this course as well as the foundation course is essential. While there is some difference of opinion among experienced builders as to the advisability of full rolling on all kinds of stone in the penetration course, there is no doubt whatever as to the necessity for a most thorough consolidation of the lower courses. The possible breaking-up of softer grades of stone has no harmful effect.

It is sometimes preferable to use a base of penetration macadam instead of the crushed stone base with stone filler. Such a treatment is most effective in resurfacing an old macadam or gravel road-bed which has been consolidated to the utmost through years of travel. These beds may need to be strengthened or simply to have their crown reduced. In either case it is preferable to use the more substantial penetration course between the hard old base and the new surface course than to introduce a comparatively soft or loose course between the two.

Variations in Penetration Construction

The penetration course as built in these states varies in several ways. The best results seem to be obtained through the use of 2- or 2½-inch depth of finished course rather than with 3-inch or a greater depth. There seems to be less tendency toward displacement. Certainly it is possible to fill the voids better in the thinner course. The screen sizes vary from 2 to 2¾ inches maximum to 1 to 1½ inches minimum, the best results being obtained with the sizes 2½ to 1¼ inches for hard stone, and slightly larger for softer field or wall stone. The manipulation of this course varies in different sections and with different grades of stone. The result desired is a strong interlocking of the fragments. With a hard trap this can be secured only through considerable rolling before the first application of asphalt. But softer grades of stone will interlock under less rolling, while to continue to roll them at this stage will often crush the fragments to such an extent as to make proper peneration of the binder impossible. Regardless of the quality of the stone, a thorough rolling after completion of the pavement is always desirable. This back-rolling should continue for several days during the warmest hours, and under traffic is practicable.

attention is paid to uniform distribution of this highway traffic averages quite as high. Also,

The thickness of the course spread loose should be the size of the largest screen opening. The stone should be spread to a tight line on pins not over 25 feet apart. Roll enough to smooth out so the high spots may be seen. The high spots will usually be due to too many large stones, while the low spots will result from an excess of small stone. Transfer some of the large stone to the low places and some of the smaller sizes to the places where the large sizes were taken out, until the stone look uniform. Then roll again and take another look before pouring.

To get good results, the surface must present as nearly as possible a uniform amount of voids. The stone ought not to be rolled so tight as to retain any surplus asphalt on the surface. After the first pouring cover quickly with clean pea-stone and roll in order to stick the pea-stone into the hot asphalt. Roll only lightly, unless the road must be opened to traffic before the seal coat is applied. If so, use more pea-stone and roll tight. Later sweep off surplus pea-stone and apply seal coat and more pea-stone and give a thorough rolling. Do not allow traffic ahead of the seal coat if it can possibly be avoided. And do not neglect thorough back-rolling after all materials have been applied.

A road built this way will have a toothy surface when the surplus pea-stone have blown away and will retain this fine driving surface if pea-stone and not too much bituminous material are used in maintaining it. Do not expect to get a good job unless the voids in the top are uniform before pouring. Don't expect to get a good job if there are large areas more than one stone thick. Stone must be clean and free from mud or dust. Stone for cover larger than ¾-inch are too large and too strong to go into the voids without wedging apart the stone already in place. Surplus sizes of stone should be used in foundations or on shoulders, and all stone should be paid for by weight. In applying the asphalt, 40 to 50 pounds pressure is about right, and the temperature should be 330 degrees F. More trouble will be experienced with low temperature than with low pressure.

PENETRATION MACADAM ON THE MAIN ROAD TO BOSTON JUST WEST OF SHREWSBURY, MASS., AND NEAR WORCESTER

Methods Employed in Massachusetts and Rhode Island

After the first application of asphalt, the Massachusetts practice is to use a smaller keystone than is specified in Rhode Island. This stone in Massachusetts is ¾-inch to ¼-inch, and the same size is used as cover over the seal coat of asphalt. The Rhode Island practice is to use a keystone from a 1-inch to ⅝-inch size as filler for the penetration course, while for the final cover stone of a ⅝-inch to ⅜-inch size is used. In both states careful

attention is paid to uniform distribution of this stone and the removal of any excess. This is essential if a riding surface that will stay smooth is to be secured. Uniformity is a prime requisite in this type as in most others. To secure uniform penetration from uniform pouring, it is necessary that the surface voids of the rolled course be uniform. This is not difficult of attainment if its absolute necessity is kept in mind.

In Massachusetts the first application of asphalt is 2 gallons per square yard for a 2½-inch course, and 1¾-gallons for a 2-inch course, either being followed by a ½-gallon seal coat. Rhode Island pours 1¾ gallons first pour, followed by a ¾-to 1-gallon seal coat. The effect of these differences in sizes of keystone and rate of pour becomes evident after two or three years' service. The Massachusetts macadam is slower to fill to a smooth sheet-like surface. It remains toothy, with the stone showing appreciably, for several years longer than is true in Rhode Island. These states are mentioned because theirs is the typical practice throughout New England, a practice which has secured most satisfactory results over a long period of years under traffic conditions that compare in severity with any that exist in a like area.

Rhode Island claims more motor cars per mile of highway than any other state in the Union. It is reasonable to presume that her highway traffic averages quite as high. Also, as the state is highly industrial and is situated in a highly developed area, the percentage of trucks, particularly heavy trucks, is large. The 1924 traffic count figures for Massachusetts show a daily average per station, for the whole state, of 3,721 vehicles, with a maximum daily average of 17,715 vehicles, with 9 per cent trucks and busses. While the average figures for Maine are smaller—1,269, the distribution of traffic is less uniform, giving high maximums for many individual routes. Their opinion of the adequacy of the type is reflected in this recent statement by the Maine Commission: "On the basis of Maine construction and maintenance experience, it is believed that bituminous macadam, of the type now being constructed in the state of Maine, will adequately serve the present and future traffic on these highways (referring to a large part of their primary system) for the expected life of the bituminous macadam type of the construction." Also, Maine reports state: "* * * * traffic is being carried on the bituminous macadam roads at a cost of 1/6 as much per vehicle-mile as on the gravel-surfaced highways." Massachusetts in 1925 awarded about 72 miles of the macadam type, just four times the mileage of the next highest, which is asphaltic concrete, with 18 miles. New Hampshire figures show the same predominance.

(To be continued in the August issue)

Pipe-Laying Methods

By John W. Toyne

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NO single line of activity in which water-works men are engaged is as universal as pipe laying, whether it be to serve such cities as Greater New York, or London, or a village of some two or three hundred people. One is confronted with an almost endless combination of materials and conditions. The pipe may be steel, cast iron, wood, concrete, or stone, and under each of these classes are two or more subdivisions: the steel may be hammer-weld, riveted, lock-bar or spiral; the cast iron may be bell-and-spigot, either A. W. W. A. Specifications or some modification of it, flanged, tapered male and female, ball-and-socket, or a combination of two or more of these; wood, either continuous or machine-banded of any of several different woods, and steel, iron, or allow banding; concrete, either monolithic poured in place, or pre-cast plain or reinforced of several designs of joints and types of reinforcement. Stone is practically obsolete, except for open channels or pressure tunnels.

The soil and other local influences, such as availability, cost, labor conditions, and requirements of the service, enter largely into the selection of the pipe and also the method of its installation. The soil may be anything from quicksand in aqueous suspension to solid granite; the labor, anything from "Mexican breeds" to "technical graduates," and in the past twenty-five years I have had the pleasure of utilizing both extremes and I believe every gradation between.

The service requirement may be anything from a gravity-flow line, which might almost as well be an open channel, to a high-pressure fire service. But whatever the soil conditions whatever the labor, whatever the requirements of service, the water-works man must accept

them "as is," and the pipe must go into the ground.

Trenching and Backfilling

In Indiana by far the largest portion of the pipe installed for water-works service is cast iron, and more bell-and-spigot than all other types combined. One feature of pipe laying is common, regardless of types, kinds, and sizes of pipe—the trench must be opened and it must be backfilled. It is true, the methods employed in this vary with the conditions encountered, ranging from dry boxing to blasting, but in general the procedure follows very similar lines. It is but a few years ago that the pick and No. 2 were the generally recognized pieces of excavating machinery, and "Dobbin" and a "slip" made a very modern backfiller. Today, the modern trench excavator of the wheel, ladder or dipper type, is in common use, and the selection of type depends on the soil conditions to be encountered. Equally, the mechanical backfiller has supplanted the horse and scraper. In both these pieces of modern equipment the water-works man has a fairly wide field of choice, and so far as I am able to determine from experience and observation, all of several types have real merit, if used under conditions for which they were designed.

In equipping for this kind of work one must not overlook a trench pump or pumps, as the conditions may require. The successor of the old bailing bucket is the gas-engine-driven trench pump, usually of the self-cleaning diaphragm type, mounted on trucks or wheels to facilitate moving it without delay to any point at which it may be needed.

Joints

Probably more cast iron pipe is laid with lead joints cast in the trench than in any other manner. For years this was practically the only method used; in recent years the tapered male and female metal to metal joint has been marketed under the trade name "Universal" and used with no little success, its advantages being speed in installing and freedom from the trouble experienced in trying to cast a lead joint in wet trenches. The pre-cast lead joint is meeting with considerable favor. This joint is made complete in the pipe plant and shipped to the consumer ready to install by simply inserting the spigot into the bell that carries the pre-cast joint, and then driving up the lead.

Sulphur-base jointing compounds have been growing in favor, especially in the past six or eight years. Personally, I have laid some 50 miles of cast iron pipe, from 6 to 30 inches, using one of these compounds, Leadite, and have had excellent results. In using a jointing material of this character, it is absolutely essential that the pipe, both the bell and the spigot, be clean and free from oil or grease; that the temperature of the compound be just right, and that a gate of sufficient height be used to make up the shrinkage, which is much greater than in lead.

In reviewing pipe-laying methods, one cannot fail to note the tendency toward the elimination of hand labor and the substitution of material and equipment to this end. This is in keeping with modern practice in all lines and is largely responsible for the better working conditions, better returns, and better results.

Sterilization of the Line

There is one point that I feel has not received the attention it deserves—sterilization of the line. Time was, when any water was water, and anything that would carry that water to the consumer was a satisfactory distribution system. So far as water is concerned, that time is now history. We lay great stress on the suppression of that old landmark, the "roller towel," and the elimination of the "community tin cup." We spend literally millions to safeguard our water-supplies through filtration and sterilization; we go farther and soften the water to make it more attractive to our consumers—in some localities we even medicate it—and then drag our pipe through the mud and filth of the streets, handle it with men who, to say the least, are not surgically clean, lay it under conditions "as is," rinse it out with a little cold water, and invite our customers to try a drink of our nice, pure, softened water from it. In the light of modern knowledge of effective and economical sterilization, isn't that an absurdity?

ACKNOWLEDGMENT.—From a paper read before the Indiana Section, American Water Works Association.

What Florida Can Teach and Learn

Another installment of this symposium (begun in the June number, pages 657-660) will be published in the August issue of THE AMERICAN CITY.

KING NEPTUNE IN A RED CROSS WATER PAGEANT ON A NEW ENGLAND LAKE

Swimming Instruction Through Water Plays and Pageants

By Commodore W. E. Longfellow

Assistant National Director, First Aid and Life Saving, American Red Cross

THE American Red Cross is endeavoring to develop a rich field of educational possibilities in its program of making every American a swimmer and life saver, by the preparation and presentation of water plays and pageants. The swimming pool, the lake, the river, all offer an attractive stage on which to present stately pageantry or side-splitting comedy, combined with absorbing exhibitions of aquatic athletic prowess.

For some time the organization has felt that every swimming pool, which may become such a potent factor for health building and fun as well as for safety, should have a formal dedication to those purposes by the municipal authorities, aided by the best swimmers of that place and of the countryside. A great deal of money is involved and thousands of people are looking forward to the use of the facilities of the natatorium. It is therefore proper to open it with a dedication to Health, Safety, and Fun, making this an event of no small moment. With this idea in mind, the writer accepted the invitation of Washington University in St. Louis to write a pageant for the opening of its new pool about five years ago. This water play, which was entitled "Showing Father Neptune," was presented on two nights to more than 2,500 people, and gave to the community a new idea of the great possibilities in a swimming pool in connection with an educational institution such as this university.

"Showing Father Neptune"

The play depicts a visit of Father Neptune to the pool to ascertain the reason for its existence, and the swimmers of the city undertake to prove that it is to be used for swimming for "Health," for "Safety," for "Sport," and for "Fun." Individuals representing each of these purposes introduced a group of swimmers who used twenty minutes to half an hour of the program, while King Neptune, who emerged from the bottom of the pool, and his court sat in judgment. The outcome of the pageant is that Neptune accepts the pool as a part of his domain and gives his blessing, departing by way of the bottom to a screen placed beneath the spring-board, where he removes his special costume and emerges as just one of the swimmers. The history of this pageant might be the history of the preparation of any one of several by a municipal de-

partment or organization which is opening a pool or which wants to produce a somewhat different water show.

To facilitate matters, we assigned each of the four episodes and the court of Neptune to different committee heads, who were responsible for their respective groups. In this pageant, I played the part of Neptune and was with them for only one rehearsal. The mermaids were selected from the classical dancing group of the Women's Department of the University; they appeared in their filmy dancing costumes, which they were not required to wet. At the sound of the bugle, the pool was darkened, which enabled Neptune to get into the water unseen. The mermaids entered the darkened pool to the music of a string band recruited from the glee clubs of the University, and when the light was turned on again the mermaid procession completely attracted the eyes of the spectators. On the first night the spectators were chiefly graduates, faculty members, and patrons of the University, but the second performance was open to the student body.

For the Swimming for Health group, the athletic clubs of the Y. M. C. A. and Y. W. C. A. sent their best swimmers and gave an exhibition of strokes in marching formation.

The Swimming for Safety phase of the program was done by members of the local Red Cross Life-Saving Corps, who started in fully dressed and demonstrated parts of the life-saving tests as called for by King Neptune. One group demonstrated on the edge of the pool, while others worked in the water so that every part of the work could be clearly seen and understood.

Swimming as a Sport needed less emphasis than the two phases just mentioned, so it was placed third. It consisted of a series of events which were worked up to include relay races between married and single alumni members, various dashes by the athletic club versus the University swimming team, and a demonstration of all dives by the best divers available in the city.

The finale of the show was "Swimming for Fun," which is its own advertisement and included comedy events, such as nightgown and pajama races, clown frolic, tug of war, and water games, ending up with comedy diving. All the spectators were delighted with the program, which was different from the usual swimming meet or carnival. The costuming was simple, each group providing its own, and most of it was improvised without expense.

This pageant has been used many times since

KING NEPTUNE AND HIS COURT THOROUGHLY ENJOY TAKING PART IN SWIMMING PAGEANTS

for pool openings and at camps and schools. It invariably attracts much favorable attention and awakens interest and better understanding of swimming and life saving. In January, 1925, the writer put it on at the Hygeia Pool in Atlantic City, with the cooperation of the public schools, the Boy Scouts, the Life-Guard Association, and the local Red Cross. We had more than 200 in the pageant of which number 120 Boy Scouts were in one relay race which was run off in one heat in the Swimming for Sport section. A very popular feature was music by the Fire Department band during the long swims and special numbers. All the announcements were made by Neptune, who remained in the water during the whole performance of an hour and a half. The only non-resident of Atlantic City in the play was Neptune. It was a rainy night, but more than 3,000 people attended—all home folks.

Other Pageants Available

The success of this pageant and the apparent demand for such plays influenced me to prepare others. The last two which have been written are "How Swimming Grew Up" and "The District Swimming School." All three of these pieces have been prepared for free distribution to interested persons by the Life Saving Service of the American Red Cross. They are in multigraphed form. Their presentation should have the combined advice of persons expert in plays and pageants as well as in aquatics.

Miss Olive McCormick's water play, "The Sea Shell," produced at the Carroll Club, New York, was printed in full in *The Playground* of February, 1925, with music and dance suggestions. This type is specially good for indoor presentation, and in order to augment the seating space of the pool, it may be necessary to erect, in the shallow end of the pool, bleachers built up from the bottom and accommodating two or three hundred persons more than the normal seating space of the pool. This leaves just the deep-water area for the water work, and this may be illuminated by floodlights pointing directly into the water. A small stage may be built out over the deep end if necessary, and under this can be arranged space for Neptune, water nymphs, and sea monsters to emerge at the proper time. The stage is devoted to the use of the land dwellers and mortals, including the dancers.

Another play which can be produced on a stage of this kind is "The Pipes of Pan," and another version called "Narcissa and the Hunters," the original of which is by Miss Proudfoot, and was published in the yearbook of the Camp Directors Association about four years ago.

A word or two about "How Swimming Grew Up" might be of interest to those who want to send for it. It deals with the evolution of swimming from the days of primitive mankind down to the present and includes the evolution of diving and life saving. The program used in presenting this play at the Wheeling, W. Va., Y. W. C. A. is included here, as it may give a general idea of the possibilities:

HOW SWIMMING GREW UP
A Water Pageant
By Commodore W. E. Longfellow
Characters—In order of appearance

Mr. Sinkeasy (janitor)
Swimming Instructor
Mr. World
Mrs. World
Brother World
Sister World
Father Neptune
Davy Jones
Mr. Stone-Hatchet
Mrs. Stone-Hatchet
Sammy Stone-Hatchet
Susie Stone-Hatchet
Assyrians (3)
Greek Youths (2)
Cassius
Caesar
Breast-Stroke Swimmers (3)
Side-Stroke Swimmers (3)
Side-Stroke Swimmers (7)
William Trudgeon
American Crawl-Stroke Swimmers
Inverted Breast-Stroke Swimmers
Inverted Crawl-Swimmers

LIFE-SAVING CORPS

Rescue with Stick
Rescue by Knock-out
Tired Swimmer's Carry
Head Carry
Cross Chest Carry
Double-Arm Lock Carry
Front Strangle-Hold
Back Strangle-Hold
Double Grip on One Wrist
Breaking Two Drowning People Apart

DIVING

Fear Dive
Distance Dive
Plain Front
Running Front
Front Jackknife
Running Front with Half Twist
Swan

The latest pageant, "The District Swimming School," is along the lines of the country school plays on land, but all the recitations are done in the water by the children. There is a swimming alphabet, one letter of which each pupil receives and demonstrates in the water, and also a swimming song. There are water games at recess, recitations in diving, and water calisthenics. If prepared in an outdoor pool, the school may convene on a large float in the center and their actions be visible from all sides.

Swimming May Become America's Chief Sport

There is real need for water programs that bring together people of all types of swimming ability and representing all local organizations. A contest for speed reaches a comparatively small number. A pageant will reach ten times the number of persons who would participate in a swimming race or diving competition. They will all gain much from the participation, and their friends and relatives will be made enthusiastic about swimming from watching their part in it. It seems that there is nothing to prevent swimming

Arrests During the Year 1925 in 83 Cities of

SCENE IN A WATER PAGEANT AT THE UNIVERSITY OF MICHIGAN

from becoming America's chief sport, because it is one in which every individual can participate. With a multiplicity of pools, there is a great need for programs, and the more picturesque and colorful the swimming program can be made, the more attraction it has for a greater number of people. By combining swimming with pageantry and music, comedy and skill, a most desirable form of educational entertainment can be offered by any municipal department interested in the promotion of community recreation and health.

Water pageantry, swimming programs, and games are being taught at all the Red Cross Life Saving Institutes for training in swimming leadership, which are being held in all parts of the country each year. The Red Cross Life Saving Service will be very glad to advise with interested groups regarding this phase of its swimming educational program.

EDITORIAL NOTE.—See department of Municipal and Civic Publications in this issue for a notice of 12 swimming pageants by Mary A. Brownell, of the University of Wisconsin.

Chicago Department of Weights and Measures Issues Suggestions to the Housewife

IN a small pamphlet, recently issued, the Chicago Department of Weights and Measures offers some valuable suggestions to the housewife who would protect herself against dishonest tradesmen, urging her to learn her rights and to enforce them.

Scales, weights, and measuring devices in this city are regularly inspected by the Department, and conditions are improving to a marked degree, but with the staff available it is impossible to completely safeguard the public. With the cooperation of housewives and honest merchants, however, it is believed that the manipulation of weighing and measuring devices can be reduced to a minimum, thereby not only curbing dishonest practices but decreasing the high cost of living.

Always order a definite amount by weight or legal measure, do your own shopping, keep your eye on the scales and patronize only clean establishments, are some of the important precaution to purchasers. In addition to such general advice, the pamphlet includes tables of weights and measures and the legal unit weights of commodities in Illinois. Purchasers are urged to notify the Department of any merchant whose actions are suspicious, remembering, however, that there are honest merchants in Chicago—thousands of them—and that a mistake is not dishonesty.

Arrests During the Year 1925 in 83 Cities of 50,000 Population and Over

From Reports Made to THE AMERICAN CITY by the Police Departments Listed

City and State	Population Census Bureau Estimate for 1925	Number of Arrests: Traffic Violations	Drunkenness	Other Causes	Total	Statistics Furnished by
New York, N. Y.	**5,873,356	157,509	12,017	176,744	346,270	George V. McLaughlin, Police Commissioner
Chicago, Ill.	2,995,239	104,587	92,888	67,019	264,494	Morgan A. Collins, Supt. of Police
Philadelphia, Pa.	1,979,364	8,157	57,797	71,309	137,263	William B. Mills, Supt. of Police
Detroit, Mich.	***1,391,300	237,401‡	16,298	53,628	62,926	William P. Rutledge, Supt. of Police
Cleveland, Ohio	936,485	32,634	7,673	24,473	64,780	Jacob Graul, Chief of Police
St. Louis, Mo.	821,543	20,963	5,504	72,596	99,063	John H. Glassco, Captain of Traffic Division
Baltimore, Md.	796,296	39,056	5,687	49,778	94,521	Charles D. Gaither, Police Commissioner
Boston, Mass.	**781,529	†15,528	37,944	29,673	83,145	Michael H. Crowley, Supt. of Police
Los Angeles, Calif.	*576,673	5,289	11,290	46,888	63,467	Fred A. Knoles, Statistician, Police Dept.
Milwaukee, Wis.	509,192	8,589	14,320	10,582	33,491	J. G. Laubenheimer, Chief of Police
Washington, D. C.	497,906	33,110	11,160	33,747	78,017	Edwin B. Hesse, Supt. of Police
Minneapolis, Minn.	425,435	26,328	7,435	11,446	45,209	F. W. Brunskill, Supt. of Police
Cincinnati, Ohio	409,333	35,190	2,279	18,744	56,213	William Copelan, Chief of Police
Indianapolis, Ind.	358,819	3,148	2,410	9,765	15,323	John E. Ambuhl, Secretary to Chief of Police
Rochester, N. Y.	**316,786	1,321	1,725	3,789	6,835	Joseph M. Quigley, Chief of Police
Seattle, Wash.	*315,312	15,591	6,377	10,784	32,752	H. D. Michener, Chief Clerk, Police Department
Portland, Ore.	282,383	9,475	3,394	10,711	23,580	H. M. Niles, Lieutenant of Police
Denver, Colo.	280,911	2,481	2,982	14,893	20,356	Roger P. Smith, Secretary, Police Department
Providence, R. I.	267,918	2,308	4,192	5,770	12,270	William F. O'Neil, Supt. of Police
Louisville, Ky.	259,259	3,411	5,092	11,360	19,863	T. J. Hauler, Supt., Record and Identification Bureau
Oakland, Calif.	253,700	10,249	3,426	5,530	19,205	James T. Drew, Chief of Police
St. Paul, Minn.	246,001	9,813	4,081	2,923	16,817	J. N. Mounts, Secretary to Chief of Police
Omaha, Nebr.	211,768	3,896	5,142	9,191	18,229	C. H. Van Deusen, Chief of Police
Akron, Ohio	*208,435	37,599	4,264	6,295	48,158	John Durkin, Chief of Police
Birmingham, Ala.	205,670	20,029	4,962	17,401	42,392	C. N. Kicker, Pay Roll Clerk, Police Dept.
Atlanta, Ga.	*200,616	3,104	7,657	9,742	20,503	E. L. Jett, Acting Chief of Police
San Antonio, Texas	198,069	7,518	2,579	8,020	18,117	T. O. Miller, Chief of Police
Dallas, Texas	194,450	38,614	4,552	15,034	58,200	C. W. Trammell, Chief of Police
Richmond, Va.	186,403	3,234	2,506	14,582	20,412	R. B. Jordan, Chief of Police
Dayton, Ohio	172,942	10,321	1,178	4,222	15,721	Julius P. Oblinger, Record Clerk, Police Dept.
Houston, Texas	164,954	52,625	1,727	68,531	152,883	A. A. Fowler, Secretary to Police Chief
Youngstown, Ohio	159,970	3,981	1,999	6,137	12,117	Chas. C. Conway, Secretary to Police Chief
Bridgeport, Conn.	*143,555	820	583	2,181	3,584	Patrick J. Flanagan, Supt. of Police
Springfield, Mass.	142,224	†308	1,869	6,648	8,825	William J. Quilty, Chief of Police
Paterson, N. J.	141,695	1,316	944	2,745	5,005	Philip Riker, Secretary to Chief of Police
Trenton, N. J.	132,020	3,826	1,308	3,930	9,064	William P. Walter, Chief of Police
Salt Lake City, Utah	130,948	6,079	1,086	4,085	11,250	A. J. Mullings, Inspector of Police
Flint, Mich.	130,316	854	2,243	2,848	5,945	James P. Cole, Chief of Police
Fall River, Mass.	**129,662	2	1,602	2,527	4,131	Martin Feeney, Chief of Police
Camden, N. J.	128,642	476	1,787	4,147	6,410	James E. Tatem, Chief of Police
Des Moines, Iowa	*126,468	3,678	2,395	7,011	13,084	Victor Smith, Clerk, Police Dept.
Wilmington, Del.	122,049	1,817	1,011	4,246	7,074	George Black, Supt. of Police
New Bedford, Mass.	120,494	555	1,292	2,104	3,951	Ivar V. Nelson, Traffic Sergeant
Albany, N. Y.	117,820	2,424	3,508	2,180	8,112	Frank Laseh, Chief of Police
Norfolk, Va.	*115,777	5,367	1,652	11,460	18,479	S. W. Ironmonger, Chief of Police
Reading, Pa.	112,707	1,939	896	1,423	4,258	Harry H. Stroble, Jr., Chief of Police
Lowell, Mass.	**110,542	539	2,186	2,194	4,919	Hugh Downey, Supt. of Police
Duluth, Minn.	110,502	1,045	2,342	1,994	5,381	F. S. Johnson, Secretary, Police Dept.
Spokane, Wash.	108,897	2,072	2,560	2,279	6,911	W. H. Turner, Chief of Police
Canton, Ohio	106,260	10,858	2,516	4,932	18,306	Chas. Martin, Acting Chief of Police
El Paso, Texas	104,929	2,279	1,734	2,476	6,489	W. C. Elliott, Secretary, Police Dept.
Tacoma, Wash.	104,455	10,954	2,670	3,975	17,599	F. W. Gardner, Captain of Police
Elizabeth, N. J.	*95,783	1,167	361	3,105	4,633	John J. Ohrenberger, Captain of Police
Lawrence, Mass.	95,136	193	1,941	1,440	3,574	W. A. Chandler, Clerk of Police Dept.
Evansville, Ind.	93,601	550	574	2,895	3,019	William G. Notte, Chief of Police
Waterbury, Conn.	*91,715	1,061	1,315	2,520	4,896	Jos. H. McLean, Acting Superintendent
Harrisburg, Pa.	83,422	2,388	838	1,541	4,767	E. M. White, Clerk to Chief of Police
Manchester, N. H.	83,097	255	2,272	1,527	4,054	M. J. Healy, Chief of Police
Peoria, Ill.	81,564	69	2,215	6,521	8,805	J. S. West, Chief of Police
Gary, Ind.	76,870	392	1,653	3,381	5,426	W. A. Forbis, Chief of Police
Rockford, Ill.	76,462	1,678	1,704	1,545	4,927	A. E. Bargren, Chief of Police
Sacramento, Calif.	72,260	2,076	1,811	5,089	8,976	T. N. Koening, Chief of Police
Troy, N. Y.	**72,223	678	500	1,020	2,198	John C. Rohn, Chief of Police
Wichita, Kans.	*72,217	3,032	1,073	3,442	7,547	R. LaCroix, Supt. of Identification
Saginaw, Mich.	72,100	1,390	1,076	934	3,400	Wm. H. Kurta, Chief of Police
Binghamton, N. Y.	**71,915	174	1,780	636	2,590	Chas. P. Tobey, Clerk to Police Chief
Lansing, Mich.	70,753	1,285	804	2,600	4,689	Alfred Seymour, Chief of Police
Pawtucket, R. I.	69,760	190	809	689	1,688	Charles E. Hill, Chief of Police
Passaic, N. J.	68,979	99	450	2,800	3,349	Richard O. Zober, Chief of Police
Springfield, Ohio	68,725	3,017	391	3,586	6,994	Roy Bargdill, Inspector of Police
New Britain, Conn.	68,039	515	600	1,682	2,797	William C Hart, Chief of Police
Racine, Wis.	67,707	733	501	794	2,028	H. C. Baker, Chief of Police
Berkeley, Calif.	66,209	2,673	36	469	3,178	August Vollmer, Chief of Police
Altoona, Pa.	66,148	897	1,471	853	3,220	H. S. Carey, Secretary to Mayor
Mobile, Ala.	65,955	2,309	923	3,427	6,659	Emory V. Warren, Secretary to Chief of Police
Springfield, Ill.	63,923	402	2,355	2,137	4,894	Henry T. Crawford, Record Clerk, Police Dept.
Lincoln, Nebr.	60,941	1,522	246	1,286	3,054	Peter Johnstone, Chief of Police
Holyoke, Mass.	**60,892	358	871	722	1,951	William J. Doyle, Police Clerk.
Portsmouth, Va.	59,029	596	678	2,595	3,869	C. McL. Cuthriell, Clerk to Chief of Police
Covington, Ky.	58,309	354	454	1,181	1,989	Edward F. Suchanek, Police Court Clerk
Niagara Falls, N. Y.	**57,033	161	828	1,897	2,886	John A. Curry, Supt. of Police
Davenport, Iowa	*56,727	1,714	836	1,891	4,441	Louis Eckhardt, Chief of Police
Lancaster, Pa.	56,505	76	609	456	1,141	A. F. Montgomery, Secretary, Police Dept.

* No estimated population—that of 1920 used. ** State census—1925. *** Special census, January 1, 1926. † Ending November, 1925.
‡ See letter of Superintendent of Police Wm. P. Rutledge, on page 61 of this issue.

Wide Variations in Numbers of Arrests

BECAUSE of the surprising variation in the number of arrests in cities of similar size, as shown in the accompanying table, advance proofs were sent to the chief of police in a few of the cities listed, with the suggestion that comments would be welcome which would help the readers of THE AMERICAN CITY to interpret the figures correctly. The following replies have been received:

From Wm. P. Rutledge, Superintendent of Police, Detroit, Mich.:

In this city traffic violations in reality are not arrests. Therefore the number given—237,401—is not included in the total number of arrests.

Traffic violators are served with a notice by the officer at the time of violation, to appear at our Violation Bureau, where it is optional with the violator whether he pays a stipulated amount or appears in court, and invariably settlement is made at the Bureau.

From Joseph M. Quigley, Chief of Police, Rochester, N. Y.:

In making a comparison of the number of arrests made in Cincinnati, Seattle, and Rochester, we find that the two former cities make more arrests for violation of the traffic laws than are made in Rochester.

The discrepancy in this item may be accounted for by the fact that we make very few arrests for violation of the parking regulations. Instead of arrests, we employ the tagging and towing systems. For example, if an automobile is found parked in violation of the ordinances, one of two things is done:

(1) A tag may be attached to the car notifying the owner to report to the Captain of the Traffic Bureau, where, when he appears, the card that had been attached to his automobile is presented and the person will be requested to produce his driver's license, which is then punched by the desk officer. After the license has been punched three times or more, the complaint is filed in court and an arrest is made. Very few, however, return for the third time.

(2) But if cars are towed to the automobile pound, the owner is charged a fee of $2 to cover the cost of towing.

The above procedure has obviated to a great extent the necessity for making arrests.

The arrests for public intoxication are low because of the strict supervision of the liquor traffic and the excellent cooperation between the United States authorities and the local authorities in enforcing the prohibition law.

As to the arrests for all other causes, I might say that Rochester is a law-abiding community. We are making as many arrests, in proportion to complaints, I believe, as are effected in any other city.

The Annual Report of the Police Bureau of the city of Rochester for the year 1924 contains a table of crimes and the number of arrests made for such during the years 1915 to 1924 inclusive. A study of this table will show that crime has not increased in this city, though the population has.

Our policy here is strict and impartial enforcement of all laws.

From Wm. B. Mills, Superintendent of Police, Philadelphia, Pa.:

Replying to your inquiry with particular reference to wide variation in the number of persons arrested when compared with the population, I think you will find that this is due to the manner in which arrests are classified. In some cities the number of arrests listed includes every person for whom a summons is issued. In Philadelphia in tabulating arrests we count only those physically taken into custody, meaning those arrested on sight by the police officer.

From Patrick J. Flanagan, Superintendent of Police, Bridgeport, Conn.:

Police efficiency is not measured by the number of arrests made, but by the absence of crime, and a fairer method of comparison would be by the number of complaints received and crimes reported, which will show evidence of the manner in which the law is enforced and the law and police respected in a given locality.

Police and Judicial Action in 611 Homicide Cases

THE Metropolitan Life Insurance Company publishes, in its Statistical Bulletin for April, 1926, information as to the police and judicial action which followed 611 cases of homicides among its policyholders in the year 1922, 1923 and 1924:

"At least one year was allowed to elapse before inquiries were sent to prosecuting attorneys of counties in the United States. In the first place, 86 of these cases were justifiable homicides, where persons were killed by officers of the law while resisting arrest or while in the act of committing crime. This left 525 assailants answerable to the law for taking human life. It developed that 54 assailants committed suicide and 13 died before arraignment. Of the remaining 458 assailants, 84, or 18.3 per cent, had not been apprehended within one year after the crime had been committed! The 374 cases actually apprehended show an interesting after-history at the hands of the law. There were released by magistrates or grand juries, 108 persons against whom no case could be made, and eight were declared insane. There were actually brought to trial 258 cases or 56.3 per cent out of an original group of 458 living assailants. In 62 cases the defendants were acquited, and nine cases were still pending one year after the commission of the crime! A verdict of "guilty" was rendered in 187 cases, of which 170 were sentenced to prison for terms of varying length, eight cases were sentenced to death (seven executed and one case on appeal) and *nine* were released, either on suspended sentence or by being fined!"

Traffic Congestion, Parking Facilities, and Retail Business---II

A Study by the Bureau of Foreign and Domestic Commerce of Expressions of Opinion from Representative Merchants in More Than 800 Cities and Towns

(*Continued from the June number*)

Length of Shopping Periods

If it is desired that the length of parking time should coincide with the length of a shopping period, as is generally conceded, the question then becomes, "What is the length of a reasonable shopping period?" The present questionnaire survey shows the average shopping period to range from three minutes to several hours. Classifying all periods under the following five general periods, of less than one-half hour, one-half to one hour, one hour, one to two hours, and two hours or more, it is found that the average shopping periods in all reporting stores in the four groups of cities is as shown in the following tables:

AVERAGE SHOPPING TIME IN CITIES IN THE FOUR GROUPS
(Per Cent. of Stores)

Group	Stores Reporting	Less Than ½ Hour	½ to 1 Hour	1 Hour	1 to 2 Hours	2 Hours or More
		%	%	%	%	%
Group I.....	195	50	29	11	4	4
Group II.....	135	53	37	9	0	1
Group III.....	265	69	27	3	.5	.5
Group IV.....	462	82	16	1.5	0	.5

AVERAGE SHOPPING TIME IN CITIES IN GROUP I
(Based on 195 Replies from Cities Over 200,000 in Population)

Kind of Store	Stores Reporting	Less Than ½ Hour	½ to 1 Hour	1 Hour	1 to 2 Hours	2 Hours or More
		%	%	%	%	%
Dry Goods.....	47	11	36	23	15	15
Hardware.....	8	75	25	0	0	0
Clothing.....	36	75	14	11	0	0
Grocery.....	9	89	11	0	0	0
Shoe.....	26	46	50	4	0	0
Drug.....	19	95	5	0	0	0
Jewelry.....	28	75	25	0	0	0
Furniture.....	22	23	50	23	4	0

AVERAGE SHOPPING TIME IN CITIES IN GROUP II
(Based on 135 Replies from Cities 50,000 to 200,000 in Population)

Kind of Store	Stores Reporting	Less Than ½ Hour	½ to 1 Hour	1 Hour	1 to 2 Hours	2 Hours or More
		%	%	%	%	%
Dry Goods.....	57	37	42	19	0	2
Hardware.....	21	100	0	0	0	0
Clothing.....	10	50	50	0	0	0
Shoe.....	47	53	45	2	0	0

AVERAGE SHOPPING TIME IN CITIES IN GROUP III
(Based on 265 Replies from Cities 10,000 to 50,000 in Population)

Kind of Store	Stores Reporting	Less Than ½ Hour	½ to 1 Hour	1 Hour	1 to 2 Hours	2 Hours or More
		%	%	%	%	%
Dry Goods.....	86	42	50	6	1	1
Hardware.....	89	98	1	1	0	0
Clothing.....	9	67	33	0	0	0
hoe.....	81	67	30	2	1	0

AVERAGE SHOPPING TIME IN CITIES IN GROUP IV
(Based on 462 Replies from Incorporated Places 2,500 to 10,000 in Population)

Kind of Store	Stores Reporting	Less Than ½ Hour	½ to 1 Hour	1 Hour	1 to 2 Hours	2 Hours or More
		%	%	%	%	%
Dry Goods.....	73	60	32	7	0	1
Hardware.....	307	90	9	.5	0	.5
Clothing.....	8	75	25	0	0	0
Shoe.....	74	72	27	1	0	0

It will be noted that the majority of all recorded stores reported the average shopping period to be less than one-half hour and that this is true to a greater extent as cities decrease in size. The longer shopping periods of one hour or more are found to occur in the largest cities and are almost negligible in cities of less than 50,000 in population. It is evident that the shopping period is longest where there is more traffic congestion and at the same time less opportunity for a long parking time privilege.

Some stores, as evidenced by these tabulations, are decidedly in the short-shopping-period class, namely, hardware, groceries, drugs, jewelry, and clothing. It should be remembered that the latter type of store includes both men's and women's wear. The average shopping period reported by the men's wear stores is less than 15 minutes, while the average shopping period reported by the women's-wear stores was one-half hour. Taking the two types of stores together, which it was found necessary to do in this instance, it resulted that the average time was less than it would be if only women's wear, including the specialty shops for women, were considered. Dry goods (department stores) and furniture stores are in the long-shopping-period class, while shoe patronage is rather evenly divided between the short-period shopper and the long-period shopper.

The relation between different types of stores with different lengths of shopping periods and the length of parking periods which should be allowed, may be indicative of a trend which connects type of merchandise with a certain business location. In the central business district of many large cities, banks are found closely located, book stores have a certain neighborhood, jewelry stores are to be found

in the same immediate vicinity, shoe stores held sway in a certain part of the city, and so it is with a number of other kinds of unit stores, that is, stores where one commodity is sold.

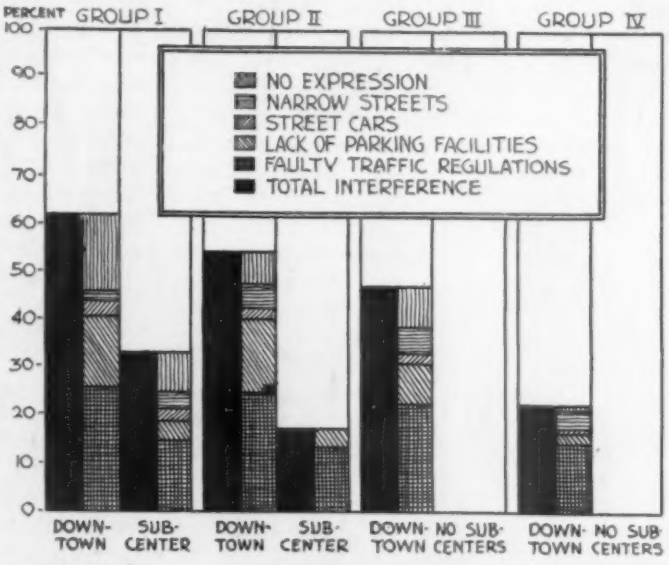
In the decentralization movement, the pioneers in moving to the residential districts are the grocery and drug stores. Since these two types of stores are in the short-shopping-period class, it seems probable that the very limited traffic relief which has come about from their establishment outside of central business districts is owing largely to this reason. The establishment of subcenters with many types of business represented, including the long-shopping-period store as well as the short-shopping-period store, should make for a greater alleviation of traffic congestion in the downtown districts.

Length of Parking Privileges in Effect

If shopping periods are approximately as indicated in the tables given on page 62, it is interesting to compare them with the table on page 64, which shows parking regulations in effect on streets contiguous to the reporting stores. The larger percentage of stores reporting in the first three groups of cities trade under a limited-parking-time privilege, while the major percentage of stores in the fourth group trade under an unlimited-parking-time privilege. Of the stores where parking time is limited, the greater number of them trade under a one-hour privilege. It will be noted that the same percentage of stores (although not necessarily the identical stores) in Group I which reported a shopping period of less than one-half hour also reported the parking-time privilege on contiguous streets to be one hour. While it is believed that the shopping period may govern the length of the parking-time privilege, it has been reported that when the periods are the same, allowing for no margin time, customers frequently experience anxiety and other forms of "parking blues." Attention has been called to the point that the shopping period lengths given are for but one store, and that a car parked anywhere in a neighborhood may be a source of potential buying for any one of the other stores located in the same neighborhood.

The enforcement of a regulation which permits of a certain leeway is claimed to be a fairer and more satisfactory regulation than that which permits of no leeway except by non-enforcement of the regulation. In a survey recently made in the business area of one city where the parking privilege was 45 minutes, it was found that the average car parked but 29½ minutes. This indicates that no undue advantage of a generous parking-time privilege is ordinarily taken.

While it is found that more than 50 per cent of the stores in each of the first three groups of cities trade under a limited-parking-time regulation, it is shown that more than 75 per cent of the stores in these same three groups of cities favor this limited-parking-time regulation. And the generally preferred length of that parking-time privilege is given as one hour. There was a noticeable expression of desire for less unlimited parking and less "no parking" than is now in effect.



PERCENTAGE OF STORES INDICATING INTERFERENCE WITH BUSINESS BY VEHICULAR TRAFFIC CONGESTION, AND THE CHIEF FACTORS CAUSING THAT CONGESTION, AS REPORTED BY 1,426 MERCHANTS

(For population figures of each group see page 665 of the June number of The American City)

It is interesting to note from this that most stores reported the chief cause of vehicular-traffic congestion to be faulty traffic regulations. Various forms of traffic regulation have perhaps aided the problem more than anything else, but there is still much to be done. Problems incident to traffic regulations, as a cause, are said to be the result of the following: unenforced regulations, unnecessary regulations, misfitted regulations, and insufficient regulations

PRESENT PARKING REGULATIONS AFFECTING REPORTING STORES IN THE FOUR GROUPS OF CITIES

Group	Stores Reporting	Limited Parking								Unlimited Parking	No Parking
		Total	10 to 15 Minutes	20 Minutes	½ Hour	40 to 45 Minutes	1 Hour	1½ Hours	2 Hours		
		%	%	%	%	%	%	%	%	%	%
Group I	240	86	7	4	14	8	52	8	7	5	9
Group II	161	89	8	3	26	10	38	2	13	7	4
Group III	291	53	3	4	19	8	42	7	17	46	1
Group IV	479	10	14	10	14	4	25	8	25	89	1

PARKING REGULATIONS FAVORED BY MERCHANTS IN THE FOUR GROUPS OF CITIES

Group	Stores Reporting	Limited Parking					Unlimited Parking	No Parking
		Total	Less Than 1 Hour	1 Hour	1 to 2 Hours	2 Hours or More		
		%	%	%	%	%	%	%
Group I	219	95	33	55	6	6	4	1
Group II	159	96	46	46	2	6	1	3
Group III	287	82	36	45	8	11	18	0
Group IV	489	35	39	37	3	21	65	0

How existing parking-time regulations on streets contiguous to reporting stores compare with regulations favored by merchants at those same locations may be seen by a comparison between the foregoing tables.

Relief Measures in Use for the Merchant's "Front Door"

The merchant's "front" or customer-entrance door is an important traffic contact point, and two relief measures have here been put into use by merchants and others.

One relief measure consists in providing sufficient curb footage for those customers who desire to be discharged at the entrance (chauffeur-driven and other patronage not self-driven). This measure is, of course, dependent upon the amount of curb footage actually in existence at the contact point.

The second relief measure consists of providing sufficient day storage space for those customers who desire to park their cars. In most localities it is impossible for streets to take care of all of these cars. The average shopping time in most cities throughout the country, as revealed in the present survey, is less than half an hour, and parking-time regulations at most business locations provide for a parking-time privilege of one hour. Even traffic regulations which permit of such a rapid street turnover as this have failed to accommodate the demand. Further inadequacy of parking-time regulations to meet the entire problem is found in the fact that outside of the increasingly great number of automobiles wholly out of proportion to the average merchant's curb footage, a large proportion of this automobile patronage has built up shopping-peak periods. Limited parking space is therefore not only in demand by an increased number but frequently at the same periods of the day. A better distribution of shopping, which in most cities means "shop early," has been suggested as a means of alleviating this condition. The greatest relief so far has come through the creation of specific and definite space in which the customer's automobile can be parked.

Efforts on the part of merchants to adjust store service to meet the need for parking space have taken the form of garage service, outdoor parking-area service, bus service, and chauffeur service. Eighty of these services have been reported in the present survey. A few are principally means of relieving the customer's mind from anxiety in respect to parking regulations; others are part of an advertising program. Most of them, however, do considerable to relieve traffic congestion. This survey indicates that parking services offered by merchants remove from the streets more than a million cars annually.

While the merchants attract and even encourage a goodly proportion of people found on our business streets, thereby helping to create congestion, it is not alone the merchant's but everybody's problem. The parking facilities offered by individuals and municipalities also contribute greatly toward the reduction of congestion in business areas.

Relief Measures in Use for the Merchant's "Back Door"

The merchant's "back" or delivery entrance door is another important traffic contact point, and two relief measures have also been put into use by merchants and others.

The first relief measure has attempted to eliminate as much as possible contact between delivery trucks, while loading and unloading, and moving street traffic. An analysis of 172 stores located in our largest cities shows that definite and efficient means of reducing delivery-traffic interference are in use by the

majority of these stores. Remote delivery stations, cooperative delivery systems, and various off-the-street loading and unloading methods have been found efficacious in meeting this phase of the problem.

The second relief measure of value to the "back door" of merchandising has been to avert as much as possible contact between delivery trucks in transit and other moving street traffic. Avoidance of busy streets, particularly at rush hours, by delivery trucks has been found to be of considerable value in reducing street traffic congestion.

Parking Facilities Offered by Municipalities

If the problem of providing day storage for automobiles is a municipal one, as is a popular belief, then municipal garages are a logical way of approaching the problem of lack of parking facilities. Whether or not it is agreed that this service should be considered in the same light as adequate sewerage, lighting, and other street maintenance, there is the opportunity for municipalities to afford relief to traffic to at least the extent to which private and business enterprises do.

Cities have not only established and maintained parking stations, which, in some instances, have been reported to be self-supporting but have utilized such unused space as the lake front, the shore along a river, and the ground underneath a downtown park. In one city the upper floors of a municipal market are being used as automobile storage room. In most cases there is some simple form of management, such as assigning designated sections of the space to different types of cars. Taxicabs, trucks, and passenger cars, for example, park in separate sections. Sometimes the cars are watched.

The cost of such facilities to the city is sometimes considerable. But the cost in proportion to return value is, in some cases, said to be slight. One municipal garage plan has been designed to shelter 12,000 cars. It is possible for a garage of this size to remove from the more congested downtown streets of that city most of the cars that now line the streets. The sponsors of this plan claim that with a freer circulation on busy streets, the benefits which business houses will reap are great.

Conclusion

The most important part of any city plan is said to be the traffic plan. This part of the city plan has been until recently much neglected, although it appears to be especially important for all cities contemplating expansion. In many instances of city planning, the merchant's viewpoint has not been included, and there was no realization of the traffic "congestion tax" exacted from business. Making known the merchant's viewpoint on traffic by cooperation with traffic authorities is believed to offer retail business its greatest opportunity to contribute to the solution of the traffic problem.

That part of the traffic problem which may be said to be within the merchant's own domain, at his "front door" and at his "back door," can be relieved by profiting by the experiences of other merchants related herein and elsewhere. However, since traffic conditions vary at each and every store location and sometimes from day to day, it is necessary that the experiences of others be considered in the light of conditions at the merchant's own store.

"Stop—Through Traffic"

To the Editor of THE AMERICAN CITY:

In your March number, page 313, was a very interesting article by Earl J. Reeder, of the National Safety Council, on the sign and signal treatment of through streets.

Mr. Reeder's article prompts me to suggest a supplementary thought which appears to have some value.

At present various designations apply to the stop requirements for through streets. Thus we have "Through Street—Stop," "Arterial Street—Stop," "Boulevard—Stop," etc. Shortly, when this rule is applied to state and county highways, we may expect "Main Market Road—Stop," "State Highway—Stop," and other designations. A driver, particularly while touring, will be confronted by a multiplicity of wordings all indicating the same thing. Again, signal and sign manufacturers will have to make dies for and otherwise equip for the production of this variety of wordings. The cost of this preparation and of the larger stocks to be carried will be considerable and will be passed on to the customer.

There is one universal wording which applies to state or county highways and all manner of city streets. This is, "Stop—Through Traffic." If all signs carried the expression "Stop—Through Traffic," the whole matter would be simplified for the motorist, for traffic officials, and for the manufacturer. It would not prevent a street's being designated by ordinance as a "Through Street," "Arterial Highway," or otherwise.

Several states have already adopted the expression "Stop—Through Traffic." I should like to suggest its universal acceptance.

G. G. KELCEY.

Elizabeth, N. J., May 24, 1926.

ONE OF THE BURIAL SECTIONS OF FOREST LAWN MEMORIAL PARK, GLENDALE, CALIF.
Note the lines of grass-level markers—rectangular stones suitably inscribed, set into the ground at the level of the turf

Making a Cemetery a Civic Asset Instead of a Civic Liability

By Leslie S. Hoagland
Forest Lawn Memorial Park, Glendale, Calif.

CLOSELY adhering to a policy of developing a great cemetery property for the benefit of the living as well as for the proper care of the remains of those who have passed beyond, the management of Forest Lawn Memorial Park at Glendale, just halfway between the cities of Pasadena and Los Angeles, Calif., has during the past eight years created a great civic asset out of what is too often allowed to become a civic liability.

In 1917, when purchased by the present organization, the property comprised about 50 acres, mostly undeveloped but with a few acres in use as an ordinary cemetery. The ownership of the unsold land in this property was acquired by the American Security and Fidelity Company of Los Angeles, numbering among its officers and Advisory Board several of the most prominent and progressive men of southern California. This company has added to the property until it now comprises a total of 220 acres embracing hills and valley land which admirably lend themselves to the finest of landscaping, parking, and building

MAUSOLEUM-COLUMBARIUM, FOREST LAWN MEMORIAL PARK
Four units or terraces have been built, three of them are occupied, and the fourth is receiving its interior finish. The fifth unit will soon crown the structure

development. The expert landscaping and extensive planting of section after section of this large property, together with the substitution of grass level markers for old-fashioned headstones in all new sections, has resulted in the creation of a beautiful park, wooded and threaded with driveways and walks.

Entering through a formal gateway from the public boulevard, a sweeping drive approaches an administration building of Elizabethan architecture overlooking broad lawns, a large ornamental pond, and heavy shrubbery. This building backs against a hill gently rising to a plateau immediately behind which is the highest elevation on the property. To crown this hill there has been erected the Tower of Legends, an ornamental mass of dignified, simple lines enclosing the huge water-tower which serves the property. The steps in front of the Tower of Legends leading down from it to the plateau are made to serve each year as the rostrum and choir-stand for a most impressive Easter morning service. This service is attended usually by 10,000 to 15,000 people, who gather on the level plateau and welcome the rising sun from this high point, which overlooks the entire country for many miles in all directions.

Around a bend in the main drive from the administration building and surrounded by a beautiful growth of trees, has been built a church modeled upon the church at Stoke Pogis near Windsor, England, in the churchyard of which Gray wrote his immortal Elegy. On one of the main driveways circling the rising hills of the north end of this large property an admirable site was chosen for a big Mausoleum-Columbarium, the double concrete and granite walls of which, as it rises tier upon tier against the hill, are tied into the everlasting rock of the hill itself. Crypts, vaults, private rooms and alcoves for niches

AIRPLANE VIEW OF FOREST LAWN MEMORIAL PARK

The park extends from the ornamental water-tower in the upper left of the picture down the hill to the margin of the view. The upper boundary runs from just north of the tower across the picture above the electric sign in the upper right to the fence line running down the hill to the right margin. The lower border of the property is marked by the shrubbery, trees, and road above the houses and lots. The Little Church of the Flowers is in the left center, and at the right of the picture the big Mausoleum

SUNRISE SERVICE BEFORE THE TOWER OF LEGENDS ON THE HIGHEST HILL OF THE FOREST LAWN MEMORIAL PARK

are provided in this structure, which also has a complete cremation equipment. The cost of the building will approximate $2,000,000.

Next to the landscaping and extensive planting, the most striking improvement is the ornamentation of buildings and grounds with world-famous statuary. In their choice of art treasures in marble and bronze to ornament the grounds and buildings of Forest Lawn, the management of the property have been guided by a desire to provide an inspiration for the living through the highest forms of art typifying the best of human instincts and the joy and sweetness of life. The appreciation of this policy is shown by the records of the thousands of people strolling or driving through this great park every month and enjoying its beauty as well as the steadily increasing number of the finest forms of art which it presents. The chairman of the Advisory Board of this property, Hubert Eaton, in a desire to provide for southern California the most authentic representations of some of the masterpieces of European statuary, arranged during a visit in Italy several months ago to have reproduced in full size those pieces of statuary which he particularly wanted but the originals of which could not be purchased. As a result of this trip there is now being received for placement at Forest Lawn a full-sized copy of Michael Angelo's "Moses" made of Carrara marble in the Frilli Studio at Florence, Italy, under the direct supervision of Professor Vene of the Ministry of Arts of Rome. In the same manner, Brazza's "Finding of Moses" is being reproduced; also Canova's "Three Graces." As a further result of Mr. Eaton's trip, a copy of Thorwaldsen's "Christ" was recently received and has already been placed near the entrance to the Little Church of the Flowers. Within the Mausoleum are a large number of fine marbles, among the best-known being Fanfani's "Mother Love," Canova's "Cupid," and Morelli's "Battle of the Flowers." In the center of a huge ornamental pond in the park is a pedestal bearing the statue of the "Duck Baby," formerly exhibited at the San Francisco Exposition by Edna Parsons, and marking the Babyland section of the cemetery is a remarkable bronze statue of a child, by Romanelli. An art subject which promises to attract very wide attention is the reproduction in full size upon glass of Leonardo Da Vinci's famous painting of the "Last Supper."

ARTIFICIAL LAKE IN CORNER OF PARK AS VIEWED FROM THE ADMINISTRATION BUILDING NEAR THE PARK ENTRANCE

MAP SHOWING PROPOSED CHANGES IN PECATONICA RIVER AT FREEPORT AND EAST FREEPORT, ILL.

Flood Protection for Freeport, Ill.

By W. G. Potter

Drainage Engineer, Division of Waterways, State of Illinois

FREEPORT, a town of about 20,000 population, is located on both sides of the Pecatonica. On the south side of the river is most of the business section, on ground high enough to avoid overflow. North of the river is a very large part of the manufacturing district of the town. Unfortunately, nearly all of this part of the town is below the high-water line, and much of it is below the floods which come periodically, sometimes as often as once a year. Streets are flooded, manufacturing establishments are necessarily closed, and the financial loss due to wages lost, shops closed, and transportaition interrupted, amounts to a high figure. In 1916 alone the loss was estimated at $100,000 or more.

Condition of the River

The Pecatonica River is a very tortuous stream and just above Freeport has several large loops and bends. On these bends the banks are low and they are overtopped in every flood. The soil and sub-soil are a loamy clay, subject to wash and disintegration in the face of a strong current. The width of the river at Freeport is from 110 feet to possibly 160 feet, the average being about 140 feet. Located nearly in the center of the town is Goddard's dam, owned and operated by the Freeport Railway and Light Company, and producing power for traction and lighting purposes. The length of this dam is 119 feet, and at medium low-water stage it has a head of about 4 feet. In the extreme low water and again at high-water periods, the dam produces no available power, and to offset such periods, the company has an efficient steam auxiliary plant. At various points along the river, sewers enter which dump the sewage of Freeport entirely untreated into the stream. This has caused a foul, slimy deposit on the bed of the stream, and during the hot low-water months of the summer and fall, the floating pollution may be traced both by sight and smell for several miles below town. In many places, encroachments have been made by the manufacturing plants along the river, which have narrowed the channel considerably.

Railroads and Bridges

Three railroads and one electric railway enter Freeport, all of which are vitally concerned in the present condition and its improvement. The Illinois Central main line from Chicago to Omaha enters from the east and parallels the river on its right or south banks. It has no bridges in the city but maintains division headquarters and is cramped for space along the river. Its tracks, however, are above high water. The Chicago and Northwestern Railway enters from the east and parallels the left bank of the river, partly below high-water line. It crosses the river on a two-span plate-girder bridge located in a very bad bend of the river. This bridge and its center pier form a serious obstruction to the flow of the stream. This railroad joins with the Illinois Central Railroad on the south bank and uses the same station near Stephenson Street. The Chicago Milwaukee and St. Paul Railroad comes in from the northeast, maintains a station on the north side, and crosses the river on a three-span

PECATONICA RIVER AT FREEPORT, SHOWING GODDARD'S DAM AT MODERATE HIGH WATER

truss bridge, also at a bad angle. This road also maintains a transfer bridge connecting with the Illinois Central Railroad and Chicago and Northwestern Railway. This is a two-span bridge below the Goddard dam. The tracks of the Chicago, Milwaukee and St. Paul Railroad, traversing the manufacturing district of East Freeport, are periodically flooded and put out of commission.

The Rockford and Interurban Electric Railway enters the town from the east parallel to the Chicago and Northwestern Railway and, using streets for trackage, crosses the river on the Stephenson Street highway bridge, a concrete structure of three spans.

Besides these bridges, we have two highway bridges crossing the river, one at Hancock Street and one at Van Buren Street. Practically all these bridges have either been condemned or nearly outlived their usefulness and will soon have to be replaced. Along the south bank of the river below Stephenson Street a concrete retaining wall has been built above flood height, and beyond this wall in both directions the railroad tracks are also above flood height, but the lack of space between the river and the manufacturing plants and other city developments prevents the track and station changes which should otherwise come to the city.

Proposed Change in River

Three different solutions have been studied for the problem of flood relief, but, before taking these up, the plan for widening and using the river in its present location will be considered.

In the first place, in this as well as in the other projects, it is considered for the best interest of the town to condemn Goddard's dam. The power is available only for a portion of the time, and by changing the course of the river, the dam would be abolished anyway. Therefore, in considering the river in its present location, it is also abolished. The heaviest flood on record at Freeport had a discharge of about 17,000 cubic feet per second. A flood of 25 per cent greater discharge may reasonably be expected often enough to be within the limit of economical consideration. To carry 21,000 cubic feet per second through its present windings and rough banks would necessitate a channel of 220 feet base with slopes of 2 horizontal to 1 vertical, a depth of 15 feet, with a fall of 2 feet per mile. Leaving the dam out of consideration, this fall can be obtained. However, a channel of this base and depth means a width of 280 feet at the top against a present average width of about 140 feet. This would double the present width and still leave considerable of the bank line below high-water level and would thus necessitate a levee or wall in such places. The additional width would in many places be hard to obtain except at a very high price. Also, all bridges would have to be rebuilt much longer than at present. A channel 250 feet wide with vertical retaining walls on each side and a depth of water of 15 feet would also suffice, but this would entail the heavy cost of retaining walls as well as right of way and new bridges. Because of these conditions this project is not further considered.

Project A

The capacity accepted for study and report was to carry a 21,000 cubic feet per second discharge without overflowing the natural banks. This is done with room to spare, except in the waste land from Taylor Park to the river. This is low ground subject to overflow several times a year by any very moderate high water. The cross-section assumed is for a 200-foot base with slopes 2 horizontal to 1 vertical. The grade allowed is 0.04 feet per 100, or 2.112 feet per mile. Station O is at the down-stream end of the proposed channel. The alignment is straight from Station O to Station 35 plus 48, where a 3-degree curve to the left carries the channel to Station 50 plus 67. From this point the channel runs straight and intersects the river at about Station 99. Single-track bridges would be required at the Chicago and Northwestern Railroad crossing and at the R. & I. Electric Railway; a double-track bridge would be required for the Chicago, Milwaukee and St. Paul Railroad, and highway bridges at Taylor Avenue, Henderson Avenue, and the Cedarville Road.

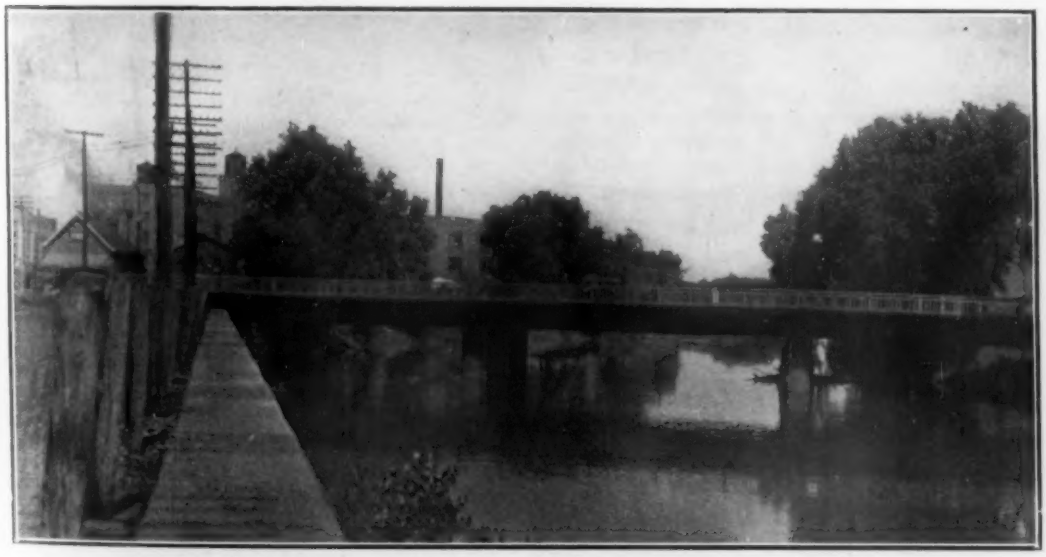
A right of way 500 feet in width would be required. Below Taylor Park the line follows a small branch, as above described, subject to numerous overflows and of no great value. It will be necessary to take the north end of Taylor Park; but I am told there is no objection to that, as the main part of the park would not be affected.

Between Taylor Park and Henderson Avenue the land is tillable but subject to overflow and too flat to drain well at present. It was largely under water at the time of our survey, not because of the river, but on account of insufficient drainage. West of Henderson Avenue the land is good and all either in cultivation or in pasturage. It is, however, well under the flood height of 1916. The main objections to this route are, first, that its upper end is at a point below the bends in the river which cause the most trouble in overflows. The banks of the river above this are mostly low, and the river itself bends back to the south and causes overflows at and around the city water-works and its wells. Second, this route necessitates the condemnation of land at the upper end now occupied by buildings and houses, and the cost would be consequently greater per acre. The length of Project A is 9,900 feet, or 1.87 miles. The cost of this route is estimated as follows:

Excavation, 1,429,000 cu. yds. at 20c	$285,800
Right of way	23,700
Purchase of buildings	10,000
Bridges—	
2 single-track R. R.	55,000
1 double-track R. R.	86,000
3 highway bridges	60,000
Purchase of Goddard's dam rights	15,000
Miscellaneous damages	10,000
	$545,500
Overhead charges 10 per cent	54,550
	$600,050
Contingencies 10 per cent	60,005
Total estimate	$660,055

Project B

Project B is the same as Project A up to Station 74 plus 75. Here it branches off with a 2° 15′ curve to right which ends at Station 90 plus 70. From here the course is straight



STEPHENSON STREET BRIDGE OVER THE PECATONICA RIVER AT FREEPORT
The Illinois Central retaining wall is seen at the left

till it strikes the river at Station 122. From this point it follows the bend in the river about 650 feet, and then by an additional channel 550 feet long again strikes the river at the bend above the rendering works. This route, while longer than Project A, will eliminate the three bad bends in the river above town and remove all possible chance of pollution to the city water-supply. The bad features are that it goes through some of the best farming land and that it either requires an additional highway bridge over the road leading north from the Cedarville Road, or else requires that that road be closed. The length of this project is 13,400 feet or 2.54 miles.

The estimate of cost for Project B is as follows:

Excavating 1,808,000 cu. yds. at 20c	$361,600
Right of way	32,200
Purchase of buildings	5,000
Bridges—	
2 single-track R. R.	55,000
1 double-track R. R.	86,000
4 highway bridges	80,000
Purchase of Goddard's dam rights	15,000
Miscellaneous damages	10,000
	$644,800
Overhead charges 10 per cent	64,480
	$709,280
Contingencies 10 per cent	70,928
Total estimate	$780,208

Project C

This project also has the same route as Project A from the lower end almost to the Cedarville road. Here it diverges and turns to the right on a 3 degree curve. It crosses the Cedarville road and runs through a slough west of that point and then straight to a point near the second bend in the river. Here it curves and follows the course of the river till it joins the course of Project B from the second bend of the river to the upper end on the third bend. This route is slightly longer than that of Project B, but, on the other hand, it passes through poorer land and also avoids the extra bridge called for on Project B. The total length by this route is 13,850 feet, or 2.62 miles.

The estimate of cost is as follows:

Excavation 1,190,700 cu. yds. at 20c	$358,140
Right of way	22,300
Bridges—	
2 single-track R. R.	55,000
1 double-track R. R.	86,000
3 highway bridges	60,000
Purchase of buildings	5,000
Purchase of Goddard's dam rights	15,000
Miscellaneous damages, grading of roads, etc.	10,000
	$611,440
Overhead charges 10 per cent	61,144
	$672,584
Contingencies 10 per cent	67,258
Total estimate	$739,842

Comparison of Projects

Comparing these three projects, we find that Project A is shortest and cheapest in first cost, but its point of leaving the river is nearest the city, and because of the loops of the river above this point, it would not stop the overflows reaching the water-works and that region. Neither would it stop high water from overflowing the banks and the region north of the proposed channel.

Project B is not subject to the above objections to Project A. It also does not confiscate so much of built-up property or such valuable buildings. On the other hand, it passes through more valuable farm land and also requires an additional highway bridge or else the closing of that county road.

Project C lies between A and B and traverses considerable slough land and poor farming land in place of the good land of B. It does not require either the additional bridge or the closing of the county road which B requires. It is slightly longer than B and much longer than A, but its upper end is the same as B and means that no damage or overflow could reach the water-works, nor could it reach the valley north of the channel. For these reasons it is the opinion of the writer that Project C is the logical location for the diversion and is most feasible. Its increase in cost over Project A is more than counterbalanced by the increased amount and value of the land saved from overflow.

In case of the river's being diverted to either of these routes, the protection from floods is not the only advantage which would be obtained. The vacant strip, now the riverbed, would become very valuable, and would return taxes to the city and county. Factories abutting on either side would have room to develop their industries, and the railroads would have needed room for tracks, yard facilities, and new station. The city also would be able to solve at a low cost the sewerage problem now staring it in the face. Without question, the state will in the next few years require Freeport to treat its sewage. At present the sewage is emptied raw into the river at numerous points, with the resulting slime and odor in the stream, injurious to the health of the town.

With the river in its present location, an intercepting sewer would have to be laid on each side of the river through almost unobtainable property at an extremely high cost, to a treatment plant below town. With the river diverted, one intercepting sewer could be laid on the bottom of the present stream, connect-

ing with the sewers on each side at a comparatively low cost. There will be a very large amount of excavated material along the new channel which could be transported at a low cost to fill up the old bed after laying the sewer.

Thus, instead of the town's being divided by the river, instead of having a foul, noxious stream taking up a large area almost through its center, Freeport would have a clean stream on its outskirts; it would be free from fear of floods; it would have additional taxable area utilized for the good of the town; it could, if required, have a separation of street and railroad grades; and it would have its health improved by the removal of raw sewage from the river.

ACKNOWLEDGMENT.—From a paper read before the Fourteenth Annual Meeting of the National Drainage Congress.

Stabilizing of Employment a Community Problem

THE story of a national plan to deal with the employment situation has recently been released from Des Moines, where a similar local plan has been in effective operation for some years.

"The Manual for Conducting 'Service-at-Cost' Community Placement Bureaus" is prepared jointly by Hans C. Pfund and Ralph H. Faxon. Mr. Pfund, with more than a decade of experience in Placement Bureau work, and Mr. Faxon, well known as a commercial organization manager and for seven years General Secretary of the Des Moines Chamber of Commerce, have given an interesting story in this booklet of the fundamentals which they believe to govern legitimate and effective placement work.

Commercialization of agencies seeking to bring about better and more workable results in abhorrent, according to the doctrine laid down in the Manual. Neither can the government do it. The economic waste of the classified advertisement is pointed out as appalling, to say nothing of the moral effect of false ambitions and disappointments aroused thereby.

The answer is the local bureau, asserts the Manual: "The logical conclusion to draw is that rent, according to the doctrine laid down in the a central clearing-house through which the jobless man and manless job can be brought together with the minimum loss of time and effort. The clearing-house should not only be an employment bureau, but it should be vitally interested in the development of the community and in the individual welfare of every employee and citizen." The bureau should not sponsor the cause of either employer or employee; would not arbitrate; would be neither open shop nor closed shop; would cooperate with the government in promoting industrial activity; promote harmony between employer and employed; discourage uneconomic practices; reduce wasteful labor turnover; promote continuous employment conditions; keep residents of communities from "floating."

The Manual carries a chart of operation of the Des Moines Bureau over a period of six years, showing a total of more than 70,000 persons helped; of 32 per cent placed in permanent situations; of but $59,044 total charges made to employees. A summarization of functions and results include these advantages:

An aid to social service
A correction of promiscuous immigration
A moral agency
An educational help
Wholesome patriotic assistance

The plan for nationalization proposes: cooperation from each sizable or problem community in the country in the establishment of a local service-at-cost bureau to be known as the local office of the United States Placement Bureau; a national board of fifteen to thirty directors for three-year terms and from a suggested group of thirteen districts throughout the country; an officiary which, aside from management, shall not be paid; the management thoroughly bonded; a scale of dues for employer support of local bureaus which shall be standard; an employee membership at very low dues, such as $1 for unskilled worker and $2 for skilled, clerical, or executive worker; a local bulletin issued regularly and a national publication finally established; the additional agreement of the worker to pay 5 per cent on temporary work upon completion of that work, but not to exceed a fee to be charged for permanent position; a graded scale of fee for salaried positions; an assurance on both sides of contract and report system.

For the national body, six divisions are proposed, as follows: Executive; Clearance Activities; Auditing and Regional District; Training; Trades and Occupational Tests; Educational.

Copies of the Manual, at $1 each, may be obtained by writing to H. C. Pfund, 317 West Third Street, Des Moines, Iowa.

The Community's Greatest Moral Duty

The community's duty to education is its paramount moral duty. By law and punishment society can regulate and form itself in a haphazard and chance way. Through education society can formulate its own purposes, can organize its own means and resources, and can shape itself with definiteness and economy.

It is the business of every one interested in education to insist upon the school as the primary and most effective interest of social progress. The art of giving shape to human powers is the supreme art.

—JOHN DEWEY.

Zoning on Trial Before the U. S. Supreme Court

By James Metzenbaum
Attorney-at-Law, Cleveland, Ohio

THE cause wherein The Ambler Realty Company assailed the zoning ordinance of the village of Euclid, Ohio, is the first case involving a comprehensive zoning ordinance that has been ruled upon by a Federal trial court, and is the first cause of its kind to be presented to the United States Supreme Court. For that reason this action has engaged very widespread interest. In this cause, recently argued before the Supreme Court at Washington, two principal questions were presented:

The first complaint of the petitioner was to the effect that all so-called zoning ordinances are violative of the Federal Constitution and similarly inhibited by the state constitution.

In this, Federal District Judge D. C. Westenhaver concurred; holding that zoning ordinances are necessarily unconstitutional because they "take" property without compensation, in violation of the Fourteenth Amendment to the Federal Constitution. If this holding is upheld at Washington, then zoning throughout *all* states will necessarily fall, because of course the Federal constitution applies to all states, and for the further reason that state constitutions contain virtually the same inhibition.

The second point, to the effect that the Euclid ordinance *unreasonably* affected the land of the complainant, was likewise upheld by the trial court. The relation of this ordinance to the particular parcel of land is beyond the realm of this article, for it would require too minute a setting-forth of the details and facts to permit of space here. It should, however, be said that though the bill of complaint indulged in superlatives in setting forth the alleged sins of the ordinance as it applied to the complainant's land, and though the complaint employed almost every conceivable adjective in the description of the alleged unreasonableness of the ordinance as it affected the parcel in question, the proof was quite to the contrary. The leading real estate authorities united in their testimony to the effect that the Ambler parcel was not lessened but was really increased in value by virtue of the ordinance, and the plaintiff was compelled to admit that of the 7,400 acres of land comprised in the village, 1,500 acres—one-fifth — was open and unrestricted for industrial purposes, thus establishing the ideal ratio between industrial and residen-

Basic Reasons for Comprehensive Zoning

Neither the purpose nor the confines of this article will permit of an exposition of the philosophy of zoning, other than by saying that:

With the ever-increasing congestion, with the complexities of modern civic life, with the awakening to the need of protecting the American home from extinction and of lessening congestion in streets; with the daily increase of crowding in street cars and the easily traceable communication of sickness resulting therefrom;

With the need for the prevention of great "blighted" areas which blot and depreciate sections of every city because of the injurious invasion of worth-while sections by introducing uses;

With the realization that "mixed" streets and intermingled classes of uses mean greater fire danger for the residence which is next to the store or factory; mean increased need for fire protection, greater cost of street cleaning, need of more police, and need of heavier pavements in residence streets than would be required if business or industry were not intruded therein;

And with the depreciation of land values arising from invasion by stores into residence territories and small industries or light manufacturing into retail sections, and the appalling increase in numbers of accidents with resulting loss of life and limb;—

From all these conditions, communities have come to learn that neither the exclusion of nuisances, nor the enforcement of building codes; neither the adoption of fire zone ordinances nor the employment of tenement house codes, neither the height limitations nor the regulations which prevent more than a limited portion of a lot to be built upon, are sufficient to meet the present-day conditions.

With striking force it has come home to the American people that there is an actual need of employing the more comprehensive facilities of zoning ordinances.

tial territory and insuring the concededly desirable ratio for the housing of labor required to man the industries, if they ever come, as well as allowing for other homes. The complainant's testimony was primarily founded upon a loss in value which it otherwise might obtain if it were allowed to bring switches, spurs, and tracks out to the sidewalk line of Euclid Avenue, the principal thoroughfare, which, extending from Cleveland, Ohio, to Buffalo, N. Y., runs throughout the length of Euclid Village. The reply and proof of the village was to the effect that the bringing of tracks, factories, and switches out to the sidewalk line (instead of being kept back 750 feet therefrom) would necessarily bring smoke, odor, cinders, noise, soot, and even the rumbles of the trains and engines so close to the surrounding residential territory and hillside which prevails all along the opposite side of Euclid Avenue, and would create a menace so serious as plainly to invade the safety, health, and welfare of the community. Indeed, it was answered by the village that such a danger could be prevented under the ever recognized right to prevent and prohibit nuisances; the village contending that this right has often been upheld without the need of invoking a zoning ordinance. The village also urged that even if loss had been undisputed and if it had been proved, that, of itself, would not necessarily render a zoning ordinance illegal, for in many instances loss in no small measure results from the admittedly legal exercise of the police power.

The Big Question

But the question as to the reasonableness of the Euclid ordinance in relation to the one parcel of land is of secondary and rather negligible importance.

The large and important question concerns itself with the ruling of the trial court to the effect that zoning ordinances are necessarily unconstitutional.

How the State Courts Are Lining Up on the Constitutionality of Zoning

Prior to the oral argument of the cause of Ambler against the village of Euclid in the trial court in December, 1923, the final courts of the states of New York, Minnesota, Louisiana, and Kansas had ruled favorably in reference to the basic validity of comprehensive zoning ordinances.

On the other hand, the Supreme Courts of the states of Texas, New Jersey, and Missouri had held against the validity of such ordinances.

But by the time the Euclid cause was orally argued before the Supreme Court at Washington, in January, 1925—two years after the trial court hearing—the state of Maryland had joined Missouri, Texas and New Jersey, as unable to agree that zoning ordinances were valid (the former two of these courts having so held by a divided court); whereas, in the meantime, the lower courts of the District of Columbia and the respective Supreme Courts of California, Wisconsin, Massachusetts, Ohio, and Illinois had joined with New York, Kansas, Minnesota, and Louisiana in holding such enactments to be within the proper exercise of the police powers and to be constitutional and valid. Before each of these additional tribunals (including the Supreme Court of Ohio), the opinion of Judge Westenhaver had been urged, but each of these courts declined to concur in the ruling that zoning ordinances are fundamentally in conflict with state or Federal constitutions. The highest court of New York—once more called upon to speak upon the subject in the case of Wulfsohn against Mt. Vernon, N. Y.—reiterated its former holdings in favor of zoning and declined to agree with the trial court in the Euclid case. Each of these decisions, including the most recent New York and the two Illinois decisions rendered a few days prior to the hearing at Washington, was laid before the Supreme Court justices by counsel for the village of Euclid.

Since the hearing in January, the Supreme Court of Maine has given a rather favorable opinion to the Legislature of that state, and the Supreme Court of North Dakota, speaking only a few weeks ago through Judge John Burke, former Treasurer of the United States, has joined the favorable column with a splendid opinion in the cause of Hughes against the city of Bismarck.

Euclid Case to Be Re-argued Before the U. S. Supreme Court

When the Supreme Court of the United States re-convened on the first day of March, the newspaper despatches carried the statement that the Court, being disinclined to decide important public questions upon a closely divided basis, had therefore ordered the Euclid case to be re-argued to the Supreme Court at Washington next fall. The writer has no means of knowing if there is any division of opinion among the Supreme Court justices, nor whether such division (if it does exist) is in reference to the fundamental question of unconstitutionality or in reference to the relatively unimportant phase of the alleged unreasonableness of the Euclid ordinance as it affects the parcel

in question. It is a fact, however, that the Supreme Court has ordered the cause to be re-argued before it, and this at least betokens the fact that our highest Federal Court is apparently unwilling to immediately or summarily agree with the ruling of the trial court.

What the Country Awaits

The village of Euclid can well afford to amend its ordinance if the Supreme Court should hold it to be unreasonable in its effect upon the parcel in question, for that is of comparatively small moment; but the big issue for which counsel for the village is contending, is that quite thirty million people, from coast to coast, who now reside within the District of Columbia and in the forty-one states wherein municipalities have adopted zoning, shall learn from the highest tribunal in the land, that the basic and fundamental theory of zoning, as expressed in the usual comprehensive zoning ordinance, is legal, valid, and constitutional. If this sanction of fundamental constitutionality can be obtained from our court of last resort, then the question of the reasonableness of the effect upon the particular parcel can be yielded and waived by the village, because a validation of the basic principles of zoning by the Justices at Washington will assure every American city and town the right to protect its people, its stores, its homes, its industry, and its property by zoning regulations designed to promote and protect the health, well-being, safety, and welfare of its community.

Are You Using, in Your Bulletins and Annual Reports, Illustrations Available from The American City?

14 *Sixth Annual Report of* *Appleton Chamber of Commerce* 15

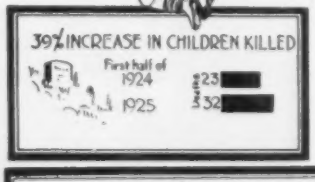
Report of Directed Play Section

Community Welfare Committee

DR. A. E. RECTOR
RICHARD MEYER
T. E. ORBISON
HUGH G. CORBETT
GEO. F WERNER

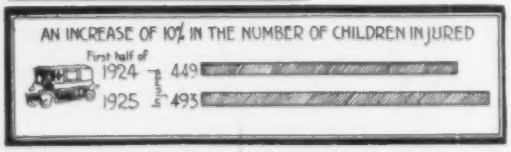
The committee made a careful study of directed play in eight Wisconsin cities.

Reports of work done outside of the State were furnished the Committee and are available. Statistics prove that less than one accident occurs in 100,000 children attending a park playground. What chance would the same number of children have on city streets?



We found that in 7 out of the 8 cities in Wisconsin where this work is conducted, the funds came from the Municipality and the work is conducted under the auspices of the Park Board or the Board of Education.

A committee advised with the Chairman of the Park Board to learn if it might be possible to make a demonstration of directed play in one or more of the City's playgrounds next summer, funds to be furnished by the Park Board.



Directed Play Gets Children Off the Streets.
(Graphs from "The American City" showing traffic accidents to children under 16 years in one of our large cities.)

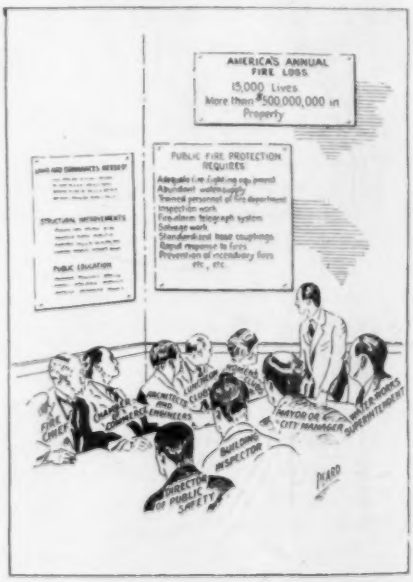
Chairman of the Board requested the Committee to secure all data possible as to expense, equipment, program, available director, and submit to the Board for consideration. This data has been secured and is available.

GEO. F. WERNER, *Chairman.*

Fire Waste Committee

GEO. P McGILLAN
GEO H. BECKLEY
P. A. KORNELY
R. E. CARNCROSS
CHRIS MULLEN

Appleton was entered in the Inter-Chamber Fire Waste Contest featured by the National Chamber of Commerce. Although we did not win the contest, Appleton did make a good showing. Battle Creek,



—From The American City.

Planning Appleton's Inter-Chamber Fire Waste Campaign.
(Municipal officials and civic organizations in an rapidly increasing number of cities are co-operating to reduce local fire losses and secure lower fire insurance rates. The economic importance of the problem is evident from the fact that fire losses in the United States, as estimated by the National Board of Fire Underwriters, passed the $500,000,000 mark in 1912 and increased to $535,372,782 in 1918, and $549,062,124 in 1924.

IN "THE SIXTH YEAR'S WORK," THE RECENTLY PUBLISHED ANNUAL REPORT OF THE CHAMBER OF COMMERCE OF APPLETON, WIS., PICTURES FROM THE AMERICAN CITY MAGAZINE HAVE BEEN EFFECTIVELY USED AS SHOWN ABOVE

Synchronized Traffic Signaling Systems

A Letter from the Inspector of Traffic Signals of Los Angeles

Editor of THE AMERICAN CITY:

Being a subscriber for your valuable magazine, and having read with interest the article on "Synchronized Traffic Signaling Systems," by John F. Robb, of Cleveland,* and, further, as you have invited comments from traffic control authorities on the points raised in Mr. Robb's letter, I take this liberty in writing you concerning the facts covering the installation and the control of automatic synchronized traffic signals as well as automatic single-intersection traffic signals not located in a congested district.

Having had the experience of installing and controlling the first automatic synchronized signal system of any size in America, and having charge of the operation as well as the creation of the timing elements for said system since its infancy to the present time, with the experience of many thousands of practical street tests, I trust that you can appreciate that statements submitted to you will be based on the findings of practical tests and not theoretical opinion.

I heartily agree with Mr. Robb that traffic engineering now has at its command data which ought to make possible the substitution of practical science for theoretical guesswork under all ordinary conditions. . . . It is a proven fact that synchronized traffic signals, correctly installed and correctly timed, will increase the factor of safety, will reduce the expense to the public, and above all will save time. It is a proven fact that if you purchase a Ford and do not know how to operate it, it is a poor investment, and just so with traffic signals.

Some years ago the city of Los Angeles installed a system of synchronized traffic signals on thirty-one intersections in the heavily congested business district. These were installed after two years of experimental work with five intersections on Broadway. The usual roar was sounded that some more of the taxpayers' money was being wasted. There was considerable opposition from the railway company claiming lost time in the thousands of dollars in the signal district. After about five years of operation of signals in the congested district of Los Angeles the recommendation of all concerned was that more signals were needed, and on January 7 of this year the City Council awarded a contract for fifty additional corners in the business district.

Since the installation of traffic signals in Los Angeles the city has accomplished with great pride the following results:

The so-called "jay-walker" or pedestrian control law became effective January, 1925, and has worked successfully ever since. Automobile deaths due to "jay-walking" for 1924 totaled 49. Automobile deaths due to "jay-walking" for 1925, the first year of pedestrian control law, were 35. This is conclusive proof of the value of the so-called "jay-walker" law. Pedestrians confused by traffic were involved in 11 fatalities in 1925, compared with 24 in 1924, a reduction of more than 100 per cent. In one year Los Angeles dropped from first place to fifth place in accidents.

An official count of pedestrians crossing Seventh and Broadway totaled 32,000 pedestrians crossing between the hours of 5 and 6 P. M. This corner is handled successfully with one officer and one split shift, with pedestrians obeying the law to the letter.

Los Angeles recently completed the installation at 100 intersections of signals, automatically operated but remotely located from the congested district, at a total cost of $140,000. These intersections, which in the past necessitated two shifts of policemen at a cost of $3,600 per intersection per year, are now being operated without the aid of policemen other than district men. It will cost to operate these 100 corners approximately $7,200 per year, against $360,000 with policemen. Since this installation the City Council has awarded a contract for an additional 100 intersections to the outlying districts.

The chief fault with traffic signals is that they are often incorrectly timed. To take care of traffic variations, the control system in Los Angeles is changed sixteen times per day. Each city has its own peculiar problems, but, based on facts of several years of good practice, there is no doubt in the minds of those who have had the experience, that with the correct application of traffic signals correctly timed and correctly operated, they will be a wise investment for any municipality.

With proper consideration for railway schedules, the lengths of blocks, the loading points, loading conditions and speeds, a system of timing can be installed that will save the Cleveland Railway the $30,000 mentioned in Mr. Robb's letter. A problem similar to this was solved along the same lines by the writer in the city of Los Angeles, and is now being successfully executed to the satisfaction of the railways, based on their running schedules in the congested district.

RALPH T. DORSEY.

* See THE AMERICAN CITY for February, 1926, page 203.

Punish the Motorist—Not His Car

Impounding automobiles and freeing reckless motorists is about as fallacious as it would be to impound the gun and free the person who carried it. Impounding cars more often punishes the guiltless while the guilty go free, because hundreds of thousands of operators do not own the machines they drive, points out the National Safety Council.

Progressive Traffic Control System Successful in Minneapolis

By A. C. Godward
City Planning Engineer, Minneapolis

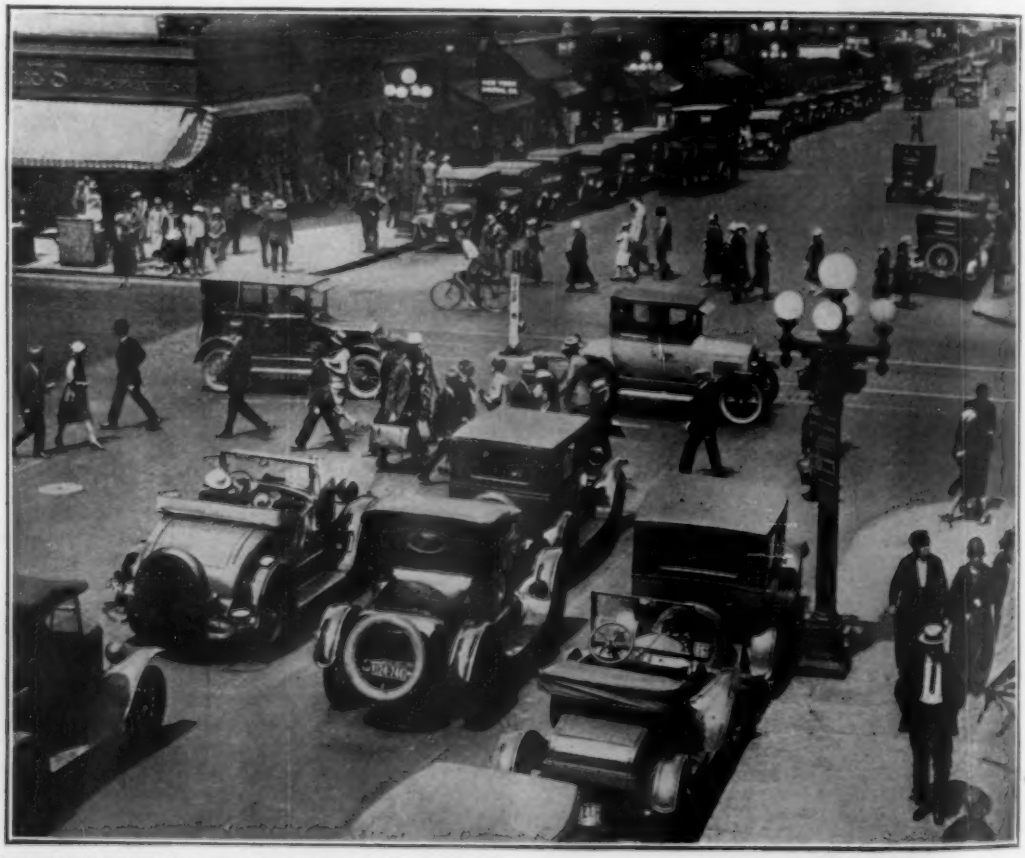
SINCE December 5, 1925, progressive traffic control of both pedestrians and vehicles has been an unquestioned success on Nicollet Avenue, Minneapolis' "department store thoroughfare." Despite the record-breaking throngs of the last Christmas season, there was not a single serious traffic accident in the zone of progressive traffic control!

Traffic counts made on Nicollet Avenue of the rush-hour traffic between 7:30 and 10:00 A. M. show a marked increase. In 1923 and 1924, under a system of traffic officers at each corner, the number of vehicles was 1,250 and 1,518 respectively, on a spring day.

A traffic count completed at the same place in May, 1926, shows 1,995 vehicles from 7:30 to 10:00 A. M.—an increase of about 52 per cent over 1923 traffic with far fewer accidents than before.

Before installation of the present traffic control system, tests showed that it actually required 5 to 6 minutes to drive from 11th to 3rd Street on Nicollet Avenue—and usually involved three to seven stops by traffic officers for cross-traffic. Today the majority of drivers move with no stops the entire distance in 2⅓ minutes, or in times of unusual congestion, with not more than two stops in a total time of 3⅓ minutes for the eight blocks, an average speed of 18 miles an hour. In other words, the speed of rush-hour traffic down Nicollet Avenue has practically been doubled.

Progressive traffic control has been so successful that we are planning to apply it to



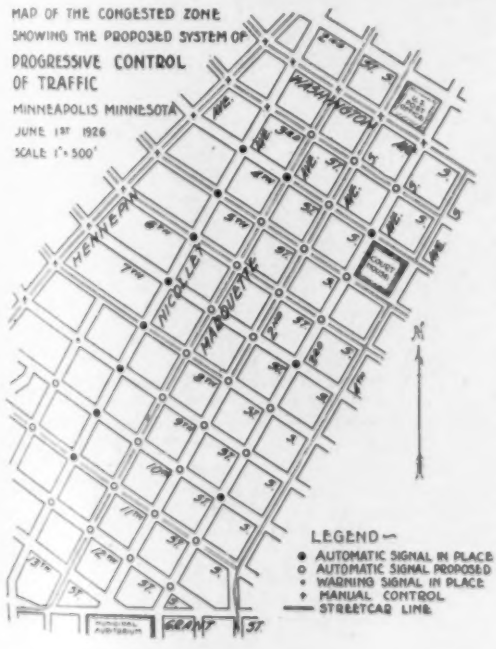
INTERSECTION OF SIXTH STREET AND NICOLLET AVENUE, MINNEAPOLIS, THE CENTER OF THE BUSINESS DISTRICT, SHOWING TRAFFIC SIGNAL IN PLACE AND SIGN ON LIGHTING STANDARD FORBIDDING TURNS AT CORNER

crosstown traffic as well, and eventually to all traffic in the downtown district from 3rd to 11th Streets and including Nicollet, Marquette, and Third Avenue South. The accompanying map shows present and proposed signal installations, which will apply the progressive system to the busy downtown area of Minneapolis.

Inasmuch as these downtown streets are all 80 feet wide and all blocks in this area are of uniform length, we anticipate complete success in achieving "no-stop" traffic in both north-south and east-west directions.

Movable Traffic Posts in Street Centers

One of the highly important factors in the success of progressive traffic control in Minneapolis has been the type of traffic signal used. After installing several signals of different type, the movable traffic post in the street center was adopted and all other signals removed. We have found that this street-center signal speeds traffic and reduces accidents, because it is always seen and understood, even by tourists from other states, who constitute a large proportion of our traffic. This type of signal is also pleasing to us financially, as its installation requires but one signal to each intersection; its ability to withstand abuse is high; and its slight repairs are quick and easy to make with interchangeable parts. Recently this post has been improved to make it use only six 25-watt light bulbs and also finally eliminating the difficulty of poor visibility against sunlight—a serious fault of every signal we have tried. By a rotating "semaphore" top, the new post has practically eliminated a fault common to traffic signals; it may now be seen directly against the sun—in fact, the sun shining through it only makes the signal words more brilliant.



Best of all, accidents have been practically eliminated. It is now *impossible* to speed on downtown Nicollet; a motorist must fall in with the established speed for which the successive traffic signals are progressively wired. To try to speed only means he must stop at each corner.

To illustrate: The other morning the writer happened to follow a high-powered sport model roadster bearing an Illinois license number and a Chicago plate, going north along Nicollet Avenue. The first three blocks, the high-pressure driver stepped on the gas and cut around other cars in high style—and was brought up with squealing brakes at each corner. Then the idea apparently soaked in, for the roaster meekly fell into procession and made the remaining five blocks at 18 miles an hour, without another stop. Under the old traffic-officer system, education of such drivers, native or imported, was a never-ending task for traffic officers and the courts; today, the signals teach them in short order.

Obedient Pedestrians

Pedestrians are also required to obey the signals on Nicollet Avenue. Contrary to anticipation, little difficulty was experienced with this innovation. Resident pedestrians quickly learned that following the signals meant safety and convenience; visitors follow their example. For added safety, no vehicle turns to either right or left are permitted on Fifth, Sixth, and Seventh Street intersections. Results show that pedestrians average an actual saving of time in crossing streets, and enjoy maximum protection.

The Nicollet Avenue traffic control system has had a hard fight at each step of its development. Difference of opinion, as well as undoubted inconveniences in the former synchronized method of operation, brought much discussion before a try-out of the new progressive system was voted. In this connection, the stand of Alderman A. G. Bastis of the Council traffic committee was the real foundation of progress: he insisted that traffic control was a technical problem and should be separate from politics. The Council supported him and agreed that trained, experienced management should handle traffic problems. Today there is practically unanimous approval of the progressive traffic control system on Nicollet Avenue.

Forty-sixth Annual Convention of American Water Works Association

Meeting at Buffalo Unusually Successful in Attendance and in Quality of Papers

BEGINNING with the arrival of the special train with 190 delegates from New York Sunday evening, June 6, followed the first thing Monday morning by the Chicago Special, the Forty-Sixth Annual Convention of the American Water Works Association was an assured success. A larger number of members were present on Monday than have ever been registered at the opening session.

Monday Sessions

Monday forenoon was devoted to registration, personal greetings, and a meeting of the Executive Committee. In the afternoon over two hundred members attended the get-together, or experience, meeting in the Chinese room of the Hotel Statler, where several very interesting topics were discussed at some length.

The first topic discussed was "Periodic Versus Continuous Reading and Billing for Water Companies and Departments." The discussion was opened by H. P. Bohman, Superintendent of Water-Works, Milwaukee, Wis., who stated that periodicity depends entirely on local conditions. Where rates are low, monthly billing is not justified, as the more frequent the billing, the greater the cost of collection.

The discussion of this topic by James E. Gibson, Manager, Water Department, Charleston, S. C., was read in his absence. Mr. Gibson believes that continuous billing is better than periodic billing, as it makes for smoother office work without periodic spurts. It is better to read meters monthly and bill quarterly. This makes it possible to send notes to excessive users at periods of about thirty days, warning against leakage. In the discussion that followed, it was brought out that the system in use at Atlanta involves a minimum monthly bill of one dollar for the smallest connection. In Atlanta there are 45,000 accounts, and the daily billing system is used. The entire city is divided into twenty-five zones. The meters in one zone are read each day. The bills are rendered in one zone each day. The "bills paid" coupons are distributed by zones, so that by noon of the next day all delinquencies are known. Approximately 1,700 accounts are cleared each day. There are no consumers' ledgers, the coupon system furnishing a check on outstanding accounts. It was argued that there is no reason for not billing consumers monthly. If gas or electric utilities can do this, there is no reason why a water department or water company should not do the same. The consumer should know his bill each month. In Atlanta each reader has a book of blank notices. When a large bill is found, the reader must leave one of these notices. This places an added responsibility on the reader, so that he is more careful in reading the meter correctly, as he does not want to be found in error. An inspector looks at once for visible leaks which he can call to the attention of the consumer. This helps greatly in reducing excessive bills.

The coupon system is used by the Consolidated Gas Company of Baltimore, according to V. Bernard Siems, Water Engineer, Baltimore, Md. There are two coupons on the bill printed on the billing machine after the name, address, zone, etc., is put on by the Addressograph. The bill shows the previous reading, the present reading, the difference, the gross price, discount, and net charge. One coupon is cut off and held at the office. One zone at a time is arranged in order and fastened together with a brad. All coupons are filed by zone and route number and kept in a filing case in the office. The bill with one coupon goes to the consumer. When the bill is paid, the coupon is detached, listed, and returned to the water-works office, where it is distributed by zone, route, book, and line. The paid bills and the unpaid bills are stitched separately. When the delinquent bills are paid, they are stamped "paid" in the set of delinquent coupons. When the next billing is made, coupons are gone over and the amount carried forward.

The discussion also brought out some difference of opinion as to the value of the card system and the coupon system. One member said that if a ledger card is used, a falling-off in the consumption can be seen at a glance. It was stated that Atlanta has exactly this information in the route book copied from the previous year's records and it is checked by the control clerk in the office, so that an inspection can be made at once to determine the reason for any great variation. In Milwaukee the cost of telephone service is about $3.75 per month, while the water bill would be less than 75 cents per month if billed twelve times a year. The cost of water in Atlanta runs somewhat higher, making it possible to bill at more frequent intervals.

V. Bernard Siems, Water Engineer, Baltimore, Md., states that in Baltimore the previous readings are kept in the meter reader's book. Eight-, six- and four-inch meters are read weekly, three-inch and two-inch meters monthly, and smaller meters frequently.

Another member stated that he did not believe that a bunch of stubs is a historic record of the indebtedness of the consumer to the city and hence is not of value for a municipal department. A card index system is used in Detroit. Stubs are satisfactory for a water company, but not for a city where the charge is a lien against the property, and a historic record is necessary to clear the property of liens when sales are being made.

The second topic discussed was "Diversion of Funds of a Municipally Owned and Operated Water Plant to the Use of Other Departments of the Municipality." George H. Fenkell, Superintendent and General Manager, Board of Water Commissioners, Detroit, Mich., prepared a discussion which was read by Daniel C. Grobbel, Assistant Secretary, Board of Water Commissioners, Detroit. He brought out that municipal officials

are constantly elected on "lower tax" platforms. Consequently, they sequester the water department income as a means of keeping taxes down; although this is fought by water officials, there seems to be an increasing tendency to use water department profits for other municipal services. The basis of this is the erroneous idea that the water plant belongs to the taxpayer, but there is a difference between the water consumer and the general taxpayer. The distinction has been upheld by law and public utility commissions. In a study of 200 water-works, all of which were self-supporting, the consensus of opinion was that if there were a surplus, it should be refunded in lower rates or used to increase the safety of the supply. The original cost of a water-works is paid for from bonds or taxes, which means that the money comes from the whole taxpayer group, but in reality the city is only lending its financial aid to a municipal necessity. The water-rates paid by the consumers retire the bonds, and replacement is made through sinking funds, gleaned from the water-rates. Reports from 200 cities showed 94 self-supporting, 8 with annual deficits, 90 whose funds were kept separate from the general city funds, 14 whose receipts were paid to the general city funds, 29 in which funds were diverted to other municipal departments, and 20 in which there was no diversion. Twenty-six reported that diversion was prohibited by local law.

John Chambers, Chief Engineer, Louisville Water Company, also discussed this topic. The bonds of the Louisville Water Company are owned by the Commissioners of the Sinking Fund of the city of Louisville. A total of $1,512,012.94 has been paid in dividends to the bond holders. This sum paid to the city has made up for the loss in liquor taxes. It is now necessary for the water company to borrow for its construction program for the next five years. If no dividends had been paid to the bond holders, no money would have to be borrowed at the present time. This topic was also discussed by letter by James E. Gibson, who said that common sense shows that all funds should be held inviolate for the benefit of the consumer, no matter what the avenue of approach of funds may be. All service given to city departments for flushing, toilet facilities, etc., should be paid for.

It was brought out that diversion of funds is chronic in Milwaukee, a total of approximately $4,517,000 having been diverted. The pretext for diversion is that the bonds were paid for by tax levy in the early days. The Water Department, however, has repaid these bonds about two and a half times to the city. Legislation has been secured legalizing past diversion and approving future diversion if two and one-half years' sinking fund payment is on hand. This is ridiculous now that $20,000 is the approximate annual payment to the sinking fund. The present scheme of diversion is used to make up for lost taxes.

In a small community a large proportion of the cost of water-works is brought about by fire service requirements. This is of necessity a diversion of funds for a general service not paid for by the city except through small hydrant rentals, which are not proportionate.

Pennsylvania law makes it mandatory that funds be kept separate, but a way has been found to get around this requirement. A borough borrows from the water-works and then forgets to return the money and sets up a new set of books the following year.

A very helpful paper on The Use of Pulverized Fuel in the Water-Works Plant was read by C. S. Denman and illustrated with a number of clear and instructive slides.

Tuesday Sessions

On Tuesday morning, June 8, the business session was held, followed by the reports of several committees and a paper by George C. Andrews on the Buffalo water-works.

The afternoon session included a very helpful discussion of Universal Metering, by John Ericson, City Engineer, Chicago, Ill., a paper on the Coordination of Fire-Fighting Facilities, by George W. Booth, of the National Board of Fire Underwriters, and a paper on Securing Improved Technical Supervision of Water Purification Processes, by H. T. Miller, Director, Bureau of Sanitary Engineering, State Board of Health, Raleigh.

Nicholas S. Hill, Jr., consulting engineer, New York City, read a paper on the use of standpipes and elevated tanks to reinforce the distribution system during periods of high demand.

The evening program, held under the auspices of the Water Works Manufacturers Association, brought four valuable papers on water-works equipment and materials, concluding with a motion picture showing the entire process of mining, smelting, refining, and manufacturing brass pipe, furnished by the American Brass Company, Bridgeport, Conn. The papers included one by Rodney D. Hall, of the Worthington Pump & Machinery Corporation, on diesel-engine-driven pumps, showing the service, reliability, and economy of this type of prime mover in the water-works plant. William J. Orchard, of Wallace & Tiernan Co., Inc., read a paper on the new W & T automatic chlorinator, showing its simplicity and reliability. The story of sand-spun pipe was told by Charles R. Wood, of R. D. Wood & Company. G. D. Conlee, of the Republic Flow Meters Company, read a paper on the advantages of the thin plate orifice versus the Venturi tube in water measurements.

Wednesday Sessions

The Wednesday forenoon session was well attended in spite of the coincident meeting of Committee No. 19, engaged in boiler feed water studies. The papers included a very close study of the strength of cast iron pipe manufactured in various ways, by Professor Arthur N. Talbot; the progress report of the Committee on Standard Specifications for Cast Iron Pipe and Specials, Frank A. Barbour, Chairman; a paper on flow surveys as an aid to fire protection, by George H. Fenkell, Superintendent and General Manager, Board of Water Commissioners, Detroit, Mich.; and a study of currents in Lake Erie at Erie, Pa., by D. E. Davis.

The afternoon sessions were run in three parts, there being a joint meeting of the Plant Management and Operation Division and the Fire Protection Division, at which Thomas F. Wolfe, of the Cast Iron Pipe Publicity Bureau, read a paper on the use of two water-mains in wide streets; E. L. Filby, Chief Sanitary Engineer, State Board of Health of Florida, read a paper on the water-supply works of the state of Florida; J. R. McWane,

of the McWane Cast Iron Pipe Co, Birmingham, Ala., presented a paper on standard lengths of cast iron pipe cast horizontally; and Oscar D. Mueller, of the Mueller Company, Decatur, Ill., read a paper on service pipe, featuring copper pipe. Scotland G. Highland, General Manager, Clarksburg Water Board, Clarksburg, W. Va., presented a valuable study of the year-round soil temperature from the surface to a depth of six feet. Frank C. Jordan presented the report of the Joint Fire Prevention Committee.

During this same time the Water Purification Division Committee No. 9 on Boiler Feed Water Studies also held sessions.

W. A. Taylor, President, LaMotte Chemical Products Company, read a very helpful paper on hydrogen-ion control that will undoubtedly do much to popularize this method, which to some still appears too technical for the average water-works operator. In discussing the meaning of the pH scale, Mr. Taylor called attention to the Fahrenheit thermometer, on which 32 degrees represents the freezing point of water. Any values higher that 32 degrees, such as 34, 36, 40 degrees, etc., denote an increase in heat, and the degree of heat increases as the numbers increase. On the other hand, any values below 32 degrees, such as 30, 28, 20 degrees, etc., denote an increase in coldness, the degree of coldness increasing as the numbers decrease.

It is apparent that it is not necessary for a person to know the derivation of the term "degree Fahrenheit" in order to determine the temperature of a solution. In an exactly similar manner the degree of acidity or alkalinity is expressed by the hydrogen-ion scale. Instead of being expressed as degrees as in the case of the thermometer, the units on this scale are called pH values. The meaning of the term pH is immaterial for the use of this method of measuring acidity and alkalinity. On this scale a value of pH 7.0 represents neutrality. This means that if the material being tested has a pH value of 7.0 it is neither acid nor alkaline.

Following the analogy of the thermometer, any values higher than pH 7.0, such as pH 7.2, 7.4 8.0, 9.0, etc., denote alkalinity, the degree of alkalinity increasing as the numbers increase. Analogously, any values lower than pH 7.0, such as 6.8, 6.6, 6.0, 4.0, 2.0, etc., denote acidity, the degree of acidity increasing as the numbers decrease.

Thursday Sessions

The Thursday forenoon session was devoted to three papers, one on the water-supply situation in New Jersey, another on specifications for riveted steel pipe with regard to hydraulic characteristics, and the third by V. Bernard Siems on a distribution feeder survey.

The Thursday afternoon session brought another joint meeting of the Plant Management and Operation Division and the Fire Protection Division, where cross-connections were discussed and a paper was presented on the experience with water-works intakes in the Great Lakes and a number of practical topics were brought up for general discussion. At the same time the Water Purification Division was listening to an interesting series of papers on the Detroit filtration plant, the prevention of corrosion and red water, the experiences with manganese in the Croton water-supply, the new rapid sand filtration plant in Washington, D. C., and tests and operating results of the lime dry feed and slaking machines at Wheeling, W. Va.

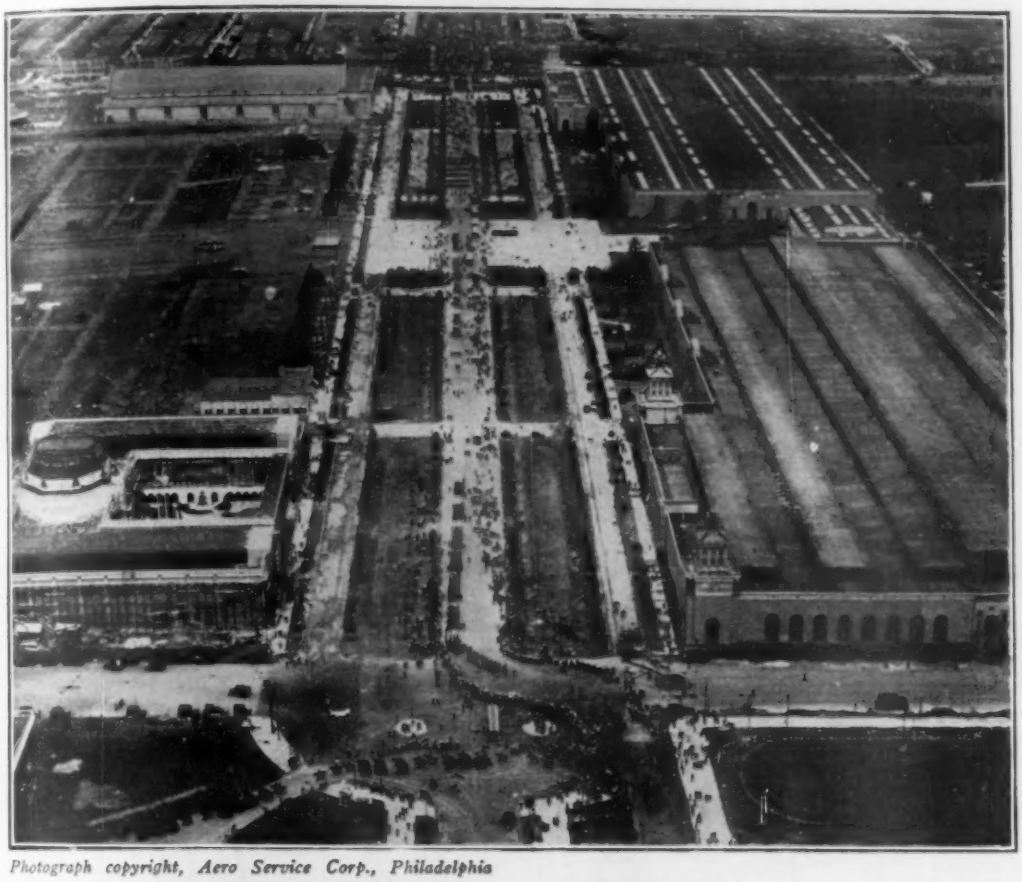
Philip O. Macqueen, United States Assistant Engineer, Washington, D. C., District, read a particularly interesting paper showing the history of the Washington, D. C., water-supply, the studies which have been made for increasing the new water-supply for Washington, which have been continued over a period of almost 40 years, and, finally, the construction of the new filtration plant near Dalecarlia reservoir. This location permitted the filter plant to be built on Government property and also to easily draw its raw water by gravity from the reservoir, which is one of the largest raw-water settling and storage basins of the Washington, D. C., system. A further advantage is the nearness of the site to a steep bank 150 feet high above the Potomac River, providing an excellent location for a 2,400-kw. hydroelectric power-plant which can utilize all the surplus water that the old and new conduits, working in parallel, can bring down by gravity from Great Falls. The power-plant will furnish the electrical energy required to pump the filtered water from the new filtration plant to all high-service areas in the district.

Economy, flexibility of operation, and compactness are the three factors which were given special attention in designing the new filtration plant. Compactness was forced into the question of design by topographic conditions. Raw water for the filtration plant flows by gravity from the storage reservoir only about 600 feet away. Treated water, settled water, and filtered water all are passed through separate passages of the control chambers, thus providing utmost flexibility. In case of necessity the treated water can be passed directly into the settling basin or the filters. The water from the mixing basins can be passed directly to the filters, or the raw water can be passed directly to the filtered-water reservoir at the pumping-station. An equally important function of the control chamber is to provide a central point for the application of alum and chlorine. When the mixing basins are operated in parallel, alum will be applied from a small gate chamber on the raw-water influent conduit about 300 feet from the control chamber, so that the solution will be evenly divided before it reaches the mixing basin. Mixing periods of 8, 14, 19 and 27 minutes, with a velocity of 2 feet per second, can be obtained with a flow of 80,000,000 gallons per day and with the basins operating in series. With the basins in parallel at the same flow, the mixing period can be made 14 or 27 minutes, with a velocity of one foot per second.

From the mixing basins the water flows through a 5 x 9-foot concrete duct about 200 feet long to two coagulating or settling basins which are located at the south side of the filtration plant. When the basins are operating in parallel at a maximum flow of 80,000,000 gallons per day, the settling period will be approximately 3 hours and the velocity of the flow will be 3 feet per minute. The filter building is 361 feet long and 155 feet wide, and contains 20 filters arranged in two parallel rows of 10 each, with a central pipe gallery. Using filtration rates of 125 and 150 million gallons per acre per day, the filter capacities are 4,238,000 and 5,086,000 gallons per filter per day.

The Friday sessions were of equal interest, but necessarily had less attendance.

Philadelphia Opens Its Sesquicentennial Exposition



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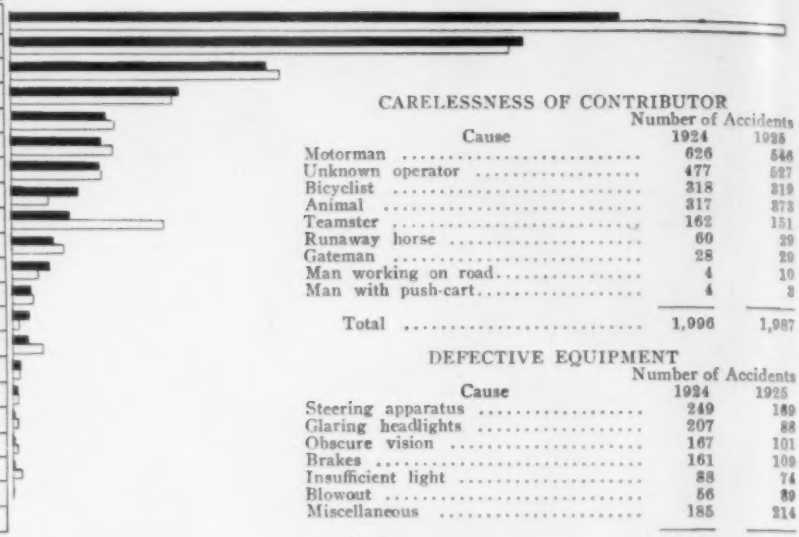
THE UPPER PICTURE SHOWS THE PARADE ON THE OPENING DAY, MAY 31, 1926, THE PENNSYLVANIA STATE BUILDING IN LEFT FOREGROUND AND PALACE OF AGRICULTURE. BEYOND ARE THE PALACE OF LIBERAL ARTS, AND THE AUDITORIUM. A CLOSE-UP OF THE AUDITORIUM IS SHOWN IN THE PICTURE BELOW

Graphic Records of Traffic Accidents

Recklessness of Motorists

Cause	Year	Accidents
Inattention	1924	4,228
	1925	5,429
Failure to grant right of way	1924	3,646
	1925	3,495
Skidding	1924	1,786
	1925	1,875
Driving on wrong side of road	1924	1,169
	1925	1,117
Careless backing	1924	653
	1925	712
Inexperience	1924	626
	1925	726
Failure to signal	1924	615
	1925	621
Following too closely	1924	486
	1925	554
Too fast for conditions	1924	405
	1925	1,054
Intoxication	1924	280
	1925	356
Cutting in	1924	262
	1925	182
Runaway car	1924	151
	1925	148
Confusion	1924	122
	1925	65
Cutting corners	1924	117
	1925	217
Passing on wrong side of vehicle	1924	57
	1925	46
Passing on curve	1924	26
	1925	28
Passing standing trolley car	1924	14
	1925	31
Passing on hill	1924	13
	1925	27
Improper parking	1924	12
	1925	91
Trying to beat train	1924	2
	1925	0
TOTAL	1924	14,559
	1925	16,378



THE Equitable Life Assurance Society, of New York, has rendered an important service to the cause of public safety by the preparation of a folder entitled "Graphical Presentation of Traffic Accident Records." This contains, on thirty separate sheets, records in graphic form of statistics presented at the National Conference on Street and Highway Safety in March last.

These charts were prepared under the direction of Lew R. Palmer, Conservation Engineer of the Society, who is also cooperating in the work of the National Safety Council as Vice-President in Charge of Public Relations.

There is also a separate sheet (reproduced on page 85) summarizing the automobile accident record of the state of New York for the calendar year 1925, as compiled by the State Bureau of Motor Vehicles.

Several of the charts analyze the motor vehicle accidents of the state of Connecticut for the years 1924 and 1925. Three of these are here reproduced. Statistics from others of the Connecticut charts follow:

TWO-YEAR ANALYSIS OF MOTOR VEHICLE ACCIDENTS, STATE OF CONNECTICUT

Cause	Number of Accidents 1924	1925
Recklessness of motorists	14,559	16,378
Carelessness of contributor	1,996	1,987
Carelessness of adult pedestrian	1,260	1,090
Defective equipment	1,113	844
Carelessness of child pedestrian	1,109	1,548
Carelessness of occupant	218	90
Miscellaneous	296	317
Total	20,781	22,568

CARELESSNESS OF CONTRIBUTOR

Cause	Number of Accidents 1924	1925
Motorman	626	546
Unknown operator	477	527
Bicyclist	318	319
Animal	317	273
Teamster	162	151
Runaway horse	60	29
Gateman	28	29
Man working on road	4	10
Man with push-cart	4	3
Total	1,996	1,987

DEFECTIVE EQUIPMENT

Cause	Number of Accidents 1924	1925
Steering apparatus	249	189
Glaring headlights	207	88
Obscure vision	167	101
Brakes	161	109
Insufficient light	88	74
Blowout	56	89
Miscellaneous	185	214
Total	1,113	844

MISCELLANEOUS

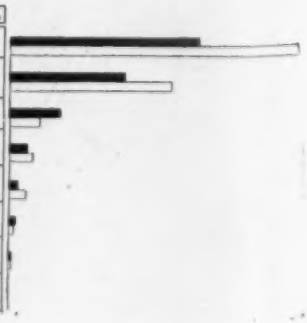
Cause	Number of Accidents 1924	1925
Road obstruction	100	78
Defective highway	96	49
Weather conditions	66	154
Ignition of gas	24	29
Overloading	5	7
Railroad crossing without gate or signal	5	5
Total	296	317

Carelessness of Adult Pedestrian

Cause	Year	Accidents
Crossing street	1924	774
	1925	748
Stepping from behind other objects without looking	1924	276
	1925	178
Intoxication	1924	92
	1925	87
Confusion	1924	61
	1925	30
Boarding or leaving trolley car	1924	37
	1925	24
Total	1924	1 280
	1925	1 090

Carelessness of Child Pedestrian

Cause	Year	Accidents
Crossing street	1924	545
	1925	872
Stepping from behind other objects without looking	1924	335
	1925	494
Playing in street	1924	146
	1925	92
Coasting	1924	54
	1925	98
Stealing ride	1924	25
	1925	43
Confusion	1924	20
	1925	18
Boarding or leaving trolley car	1924	0
	1925	7
Total	1924	1 109
	1925	1 548



Form MV-104. 5-13-25-20M (25-0727)

STATE OF NEW YORK
BUREAU OF MOTOR VEHICLES

REPORT OF AUTOMOBILE ACCIDENTS IN NEW YORK STATE DURING THE MONTH OF JANUARY - DECEMBER 1925

1. SUMMARY OF ACCIDENTS BY TYPE OF ACCIDENT AND AGE OF PERSONS KILLED OR INJURED

TYPE OF ACCIDENT	Number Accidents	NUMBER OF PERSONS KILLED						NUMBER OF PERSONS INJURED					
		All Ages	0-4	5-14	15-24	25 and Over	Not stated	All Ages	0-4	5-14	15-24	25 and Over	Not stated
0. Collision with pedestrian	29982	1155	121	381	295	244	114	29831	2185	10641	11536	3131	2338
1. Collision with automobile	10628	163	3	15	81	23	31	16104	920	971	11219	943	2451
2. Collision with horse-drawn vehicle	728	18			9	5	4	861	4	98	601	75	133
3. Collision with R. R. train	148	103		2	27	17	17	178	5	8	130	6	29
4. Collision with street car	1081	43	3	5	26	1	8	1652	26	101	1249	102	174
5. Collision with other vehicles	1916	64		6	47	6	5	2050	13	415	1345	60	217
6. Collision with fixed object	1425	146	3	2	108	14	21	2044	35	93	1578	83	215
7. Non-collision accident	990	173	5	10	123	15	20	1357	36	91	920	76	232
8. Miscellaneous	164	17	2		8	2	5	189	7	28	99	14	41
9. Not stated	26	17			2	2	4	112	1	13	76	6	16
Grand Total	47128	1891	137	421	773	329	231	54398	2834	12462	28753	4496	5884

2. HOUR OF OCCURRENCE	NUMBER OF ACCIDENTS Total	Fatal	Non fatal
12 to 1 A. M.	1600	44	1556
1 to 6 A. M.	2397	114	2283
6 to 7 A. M.	420	32	388
7 to 8 A. M.	869	35	834
8 to 9 A. M.	1397	48	1349
9 to 10 A. M.	1379	34	1345
10 to 11 A. M.	1787	72	1715
11 to 12 A. M.	2345	72	2273
12 to 1 P. M.	2216	60	2156
1 to 2 P. M.	2377	63	2314
2 to 3 P. M.	2626	92	2534
3 to 4 P. M.	2969	113	2856
4 to 5 P. M.	3365	117	3248
5 to 6 P. M.	4431	175	4256
6 to 7 P. M.	3769	135	3634
7 to 8 P. M.	3425	117	3308
8 to 9 P. M.	3156	75	3081
9 to 10 P. M.	2994	87	2907
10 to 11 P. M.	1982	85	1897
11 to 12 P. M.	1669	62	1607
Not stated	355	171	184
Totals	47128	1803	45325

3. DAY OF OCCURRENCE			
1. Sunday	7015	321	6694
2. Monday	6386	240	6146
3. Tuesday	6216	216	6000
4. Wednesday	6296	193	6103
5. Thursday	6471	268	6203
6. Friday	6534	258	6276
7. Saturday	8197	303	7894
8. Not stated	13	4	9
Totals	47128	1803	45325

4. NATURE OF INJURIES	Number of Persons Injured
0. Fractured skull	539
1. Fractured spine	58
2. Other fractures	4294
3. Concussion of the brain	382
4. Severe general shock with contusions and lacerations	7223
5. Slight shock and shakeup	37067
6. Internal injuries	637
7. Other injuries	1327
8. Not stated	2910
Total	54398

5. DESCRIPTION OF DRIVERS INVOLVED IN AUTOMOBILE ACCIDENTS	NUMBER OF DRIVERS Total	In Fatal Accidents	In Non-fatal Accidents
Driver's sex			
Male	54391	1918	54473
Female	2053	62	1991
Driver's age			
Under 18 years	156	15	141
18 to 24 years	12446	401	12045
25 to 54 years	37007	1025	35982
55 and over	1331	56	1276
Not stated	7504	483	7021
Driving experience			
0. Less than 3 months	1270	37	1233
1. 3 to 6 months	1368	27	1341
2. 6 to 12 months	2587	61	2526
3. 1 to 3 years	5293	113	5180
4. 3 years or more	38476	1005	37471
5. Not stated	9446	735	8713
Total number of drivers	58444	1980	56464

6. THE MOTORIST	NUMBER OF MOTORISTS INVOLVED Total	In Fatal Accidents	In Non-fatal Accidents
00. Driving properly	16245	406	15839
01. Skidding	2752	87	2665
02. Exceeding speed limit	2369	150	2219
03. On wrong side of road	1656	49	1607
04. Did not have right of way	4350	59	4291
05. Cutting in	817	12	805
06. Passing standing street car	310	5	305
07. Passing on curve or hill	137	5	132
08. Passing on wrong side	147	8	139
09. Failed to signal	860	7	853
10. Backing	1031	30	1001
11. Cutting left corner sharply	826	4	822
12. Car ran away	232	7	225
13. Car ran off roadway	976	110	866
14. Car passed through safety zone	95	6	89
15. Car parked or standing still	1466	27	1438
16. Driver had physical defect	43	6	37
17. Driver was intoxicated	458	31	427
18. Driver was inattentive	22862	819	22043
19. Miscellaneous	71	5	66
20. Not stated	722	127	595
Totals	58444	1980	56464

7. RAILROAD CROSSING ACCIDENTS	NUMBER OF ACCIDENTS AT RAILROAD CROSSINGS Total	Fatal	Non fatal
0. Gates not down	12	4	8
1. Guarded crossing	5	3	2
2. Unguarded crossing	78	37	41
3. Car ran through crossing gates	7	1	6
4. Driver disregarded signal	20	12	8
5. Not stated	26	18	8
Totals	148	75	73

8. CONDITION OF VEHICLES INVOLVED IN ACCIDENTS	NUMBER OF VEHICLES INVOLVED Total	In Fatal Accidents	In Non-fatal Accidents
0. In apparent good condition	34868	883	33985
1. Brakes defective	474	37	437
2. Steering mechanism defective	290	21	269
3. Glaring headlights	223	24	199
4. One or both headlights out	160	9	151
5. Tail-light out or obscured	120	5	115
6. No chain (wet and slippery road)	1304	58	1246
7. Other defects in equipment	271	14	257
8. Not stated	20734	949	19785
Totals	58444	1980	56464

10. THE PEDESTRIAN (Accidents involving pedestrian)	NUMBER OF ACCIDENTS INVOLVING PEDESTRIAN Total	Fatal	Non fatal
00. Waiting for, or getting on or off street car in safety zone	195	5	190
01. —— Same; no safety zone	493	5	488
02. Getting on or off other vehicle	307	18	289
03. Crossing at intersection—with signal	470	10	460
04. —— Same; against signal	819	13	806
05. —— Same; no signal	5709	175	5534
06. Crossing, not at intersection	5331	208	5123
07. Standing on safety zone	70	3	67
08. Walking, running or playing in str't	12494	527	11967
09. At work in roadway	763	29	734
10. Riding or hitching on vehicle	723	39	684
11. Not on roadway	892	32	860
12. Not known	22		22
13. Was intoxicated	612	12	600
14. Had physical defect	112	5	107
15. Was confused by traffic	619	20	599
16. View obstructed	565	16	549
17. Miscellaneous	25	2	23
18. Not stated	670	47	623
Totals	30811	1166	29645

9. TYPES OF VEHICLES INVOLVED IN ACCIDENT			
0. Passenger car	35745	1153	34592
1. Commercial car	10284	484	9800
2. Taxi	9623	163	9460
3. Omnibus	365	27	338
4. Motor cycle	1112	51	1061
5. All others	110	14	96
6. Not stated	1205	88	1117
Totals	58444	1980	56464

11. ROAD CONDITIONS	NUMBER OF ACCIDENTS Total	Fatal	Non fatal
0. Defect in roadway	335	9	326
1. Road under repair	295	13	282
2. Obstruction not lighted	136	1	135
3. Straight, level road	23890	1167	22723
4. Curve	1316	130	1186
5. Street intersection	20398	416	19982
6. Miscellaneous	3	2	1
8. Not stated	755	75	680
Totals	47128	1803	45325

12. ROAD SURFACE			
0. Dry surface	34752	1097	33656
1. Wet surface	9051	302	8749
2. Muddy surface	124	18	106
3. Snowy surface	873	18	855
4. Icy surface	1092	38	1054
8. Not stated	1236	330	906
Totals	47128	1803	45325

13. WEATHER CONDITIONS			
0. Clear	38501	1148	35358
1. Cloudy	2171	74	2097
2. Fog	419	18	401
3. Rain	6044	194	5852
4. Snow	736	25	711
8. Not stated	1255	344	911
Totals	47128	1803	45325

14. LIGHT CONDITIONS			
0. Day light	28518	966	27580
1. Dusk	2497	91	2406
2. Artificial light — good	5402	152	5280
3. Artificial light — poor	247	30	217
4. Darkness	9986	418	9568
8. Not stated	480	146	334
Totals	47128	1803	45325

TYPES AND CAUSES OF AUTOMOBILE ACCIDENTS IN NEW YORK STATE DURING 1925

Selling Fire Prevention to and through the Chamber of Commerce

By T. Alfred Fleming

Chairman, Campaign Committee, National Fire Waste Council

A STORY is told of two medical men who met in consultation at the sick-bed of a man suffering from a malignant fever. One of the doctors was an eminent specialist, summoned from a hospital of national reputation, while the other was a home-town practitioner, the regular medical attendant of the family. After the diagnosis of the case had been completed, both retired for a conference on the satisfactory treatment to be administered. To most of the suggestions of the expert the home town physician acquiesced, but when the specialist reached a certain point in the prescription of remedies, the second doctor apologetically remonstrated, saying he was very sure that the method proposed should not be pursued. Instantly on his dignity, the specialist replied: *"But surely I can be said to understand fevers?" "Yes,"* rejoined his humbler companion, *"You understand fevers, true enough, but I understand the patient."*

Objections Frequently Offered by Chamber of Commerce Officials to Undertaking Fire Prevention Work

1. We have too many activities now.
2. No budget is supplied for any such work.
3. We are afraid to meddle in any way with our fire department activity.
4. Our rates are high enough. We are afraid that if we stir up the subject of fire prevention our rates may be raised still more.

In citing these objections in his recent address before the National Fire Waste Council from which the accompanying article has been compiled, Mr. Fleming pointed out that these objections are not as real as they often seem. He added:

"The consensus of the opinions of different secretaries of chambers of commerce where the best results have been secured by existing fire prevention committees, shows that neither the secretary nor the members of the committee have been overburdened by the additional work. Many have expressed the fact that it has been a great pleasure to have a part in such activity in the interest of public welfare. We have yet to receive one complaint as to the extra cost requiring a larger budget. Many secretaries have experienced a most commendable cooperative spirit from the city officials and the fire department, which had not existed before. These organizations gladly welcome the support of commercial interests in their work. In many cities insurance officials and rating bureaus have given important rate reductions when much-needed improvements to the fire protection facilities have been made. The secretaries all said that the wide publicity resulting from fire prevention committee activity is a desirable feature of particular importance."

Between this incident and the situation confronting many of our American cities which are in need of treatment to protect them against the hectic fever of the flames there is a close analogy. Engineers and experts on fire prevention and protection may be said to be specialists in safeguarding American communities against fire. Their counsel and advice are invaluable. They can point the way to improved conditions and suggest satisfactory remedies. *Specifically every city presents its own individual problem in fire safety*, and this can be solved only by those who know local conditions. The engineer, being the specialist, understands *the elements which make up a well-protected city. The chamber of commerce understands the city itself.* These forces must work together if the desired results are to be secured.

The business of the world depends to the largest degree for its success upon the element of proper salesmanship. Fire prevention must be sold to each city in order that permanent results may accrue from its efforts. The hardest thing in the world to sell is something that you get for nothing. That is one reason why many chambers of commerce are slow in taking up a fire prevention campaign. The secretary is always overworked, and any addition to his duties must rob some other worthy interest of his individual attention. Proper salesmanship includes two most important essentials: first, advertising; and second, personal contact. No community will enter upon a real honest-to-goodness campaign for any specific attainment until the citizens are fully convinced of its paramount value and permanently sold on its effective outline.

There is no other important subject inter-

locked with our commercial prosperity of which so little is known as that of the prevention of fire waste. The reason is that communities have never realized they had any part in paying fire losses personally. They have always assumed that this enormous drain on our financial resources was borne entirely by large corporations. *Every man is interested in that which affects his pocketbook.* If our advertising campaign could convince each community that this great financial loss was paid in almost equal part by every individual in the United States, we should not have to ask even for the appointment of fire prevention committees. Proper advertising must precede personal contact, but personal contact is generally necessary to aid in bringing about the selection of the best men to act on the committees and to determine the scope and development of their activity.

Benefits to a Chamber of Commerce of a Live Fire Prevention Committee

Enumerating some of the salient benefits of a live fire prevention committee we find:

1. Wide and ever increasing general publicity for the chamber of commerce.

2. The chamber adds a real service which benefits every citizen of the community.

3. Improvements to the city in fire control in accordance with an expert engineering survey frequently bring a consequent reduction in rates.

4. A safer city secures an improved commercial credit rating.

5. Most important of all is the real saving of human life and property.

These are only a few of the main points of the campaign, but how can they be applied to the chamber secretary who is yet unsold? The answer is—personal contact. No secretary will take up a movement of this kind unless he is first sold as to its value. This must be accomplished by those who thoroughly understand the need and value of fire prevention work.

Great advertising campaigns put on by any company reach their climax in sales, as the result of the personal contact of their representative. This personal contact may be gained by two methods—through influential men of the city in question, who are members of the chamber of commerce, or by some representative of the National Fire Waste Council or an affiliated organization from the outside. The man on the ground is the one who has the greatest influence. He is a paying member of the chamber and therefore his suggestions have a double weight. He can assist in the selection of proper men for the committee when it is appointed and render aid in the outline and performance of the work. He is there when the emergency arises, if there is one, and is prepared to meet it. This key man must be thoroughly sold on the campaign itself and the effectiveness of the methods outlined. Some of our most active committees were brought into being and the most outstanding results secured by the personal contact and interest of such men.

There are 21 organizations and government bureaus in the membership of the National Fire Waste Council. Practically all of these have some particular representative in the different cities not yet entered in our fire prevention campaign. These representatives could without doubt bring every chamber into active participation in the fire prevention contest, if they would use their influence with the home chamber. There are members of the credit men's associations, insurance men, members of the National Fire Protection Association, the motion picture industry, the International Association of Fire Engineers, and many others who could also assist in bringing about the entry of these chambers not yet enrolled in the contest.

Topographical Surveys Essential to Intelligent City Planning

IF the work of an official city planning commission, such as is now coming to be given control of platting regulations and recording, is to be effective, the commission should have available a general plan of the community, with complete topography, showing the probable type of development of various sections, and particularly the layout of the thoroughfare system. Otherwise, it is impossible to determine in advance how any individual layout will fit in with all others. And this will become increasingly difficult as the subdivisions multiply in number.

At Pittsburgh, for example, the Department of City Planning has under way a triangulation and topographical survey which is being carried on with much accuracy. When completed, it will be of value to engineers in developing public parks and city planning programs and to developers in the promotion and layout of subdivisions. It is intended with this map as a basis to plot and file for individual developments, suitable block and lot arrangements; thus owners will know what is believed to be a rational subdivision of property with a consideration of the surrounding territory. This promises to be a valuable contribution to the ultimate betterment of Pittsburgh. It likewise would be as valuable to any city.

—From an address delivered by Morris Knowles, Chairman of the Pittsburgh City Planning Commission, Pittsburgh, Pa., before the Nineteenth Annual Convention of the National Association of Real Estate Boards at Tulsa, Okla., June 10, 1926.

Forward Steps

Reported by Municipal Officials and Chamber of Commerce Executives

Rochester Proclaims Twentieth Annual Lilac Sunday

ROCHESTER, N. Y.—Lilac time is peculiarly associated with Rochester in the minds of many people within a wide radius of this community. The reason for this lies in the fact that in Highland Park, Rochester, may be found what is believed to be the most highly cultivated and complete display of lilacs in any public park in this country, and that each spring for the last twenty years this city has observed a Lilac Sunday.

Soon after the first warm days of early spring the more than three hundred varieties of lilacs that cover almost eight acres of the park burst into bloom. The Park Department then proclaims the date of Lilac Sunday, and thousands of visitors flock to the park, that has become a mass of color. On Sunday, June 6, this year, it was estimated that 50,000 visited Highland Park, and many more came to enjoy the beauty of the flowers on the weekdays preceding and following that day. Each year the number increases, and the distances from which the visitors come are greater.

Since the trees and shrubs of the park are restricted to those not more than fourteen feet tall when fully grown, each blossom can receive its share of attention from the flower-lovers. In the afternoon a band concert is usually given so that the crowds may rest and enjoy the music after having wandered about the grounds.

This year, for the first time, the American Legion "Silent Sentinel" flags appeared in the park. They were placed there on approval, according to Park Commissioner William E. Blackwood, and if they meet with popular favor will be used in all Rochester parks on similar occasions. The flags were mounted at various points among the flowers, thus giving "Old Glory" effective settings and at the same time encouraging the Legion in its campaign to promote more general display of the national colors in Rochester and vicinity.

This remarkable lilac collection began in a meager way in 1895, when a few lilac trees were set out in the newly acquired 35-acre park, 20 acres of which had been donated to the city by Messrs. Ellwanger and Barry, nurserymen. As new varieties of lilacs became known, these were added to the collection, but the majority of the 365 varieties of blooms now to be found in the park have been developed by a process of grafting from the trees first set out. The acreage of Highland Park has also been gradually extended, until it now covers approximately 108 acres.

Coming in the spring, when the city appears at its best, Lilac Sunday of course serves as a most valuable piece of community advertising. But this city does not alone reap the benefits of the event. Information concerning the names of the many varieties of lilacs, and how they are grouped and cared for, is gleaned by the out-of-town visitors and may be put into practical use by them on their return home. Park officials, encouraged by the modest beginnings of Highland Park, have used the knowledge gained through Rochester's experiments as a basis in laying out small lilac gardens in their own towns.

It is interesting to note that, unlike Kew Gardens of London—the only park that to our knowledge possesses a lilac collection equaling that of Rochester—our park has practically no "Keep off the grass" signs. There are signs that prohibit the picking of flowers, but admonitions to keep off the grass are contrary to the policy of the park; in fact, visitors are encouraged to wander at will among the gardens. Such a practice, of course, necessitates diligent work on the part of the caretakers to keep the grounds in first-class condition, but it is the opinion of our park officials that the freedom of the park to the people is well worth the expense involved.

VERA B. WILSON.
Publicity Director, Rochester Chamber of Commerce.

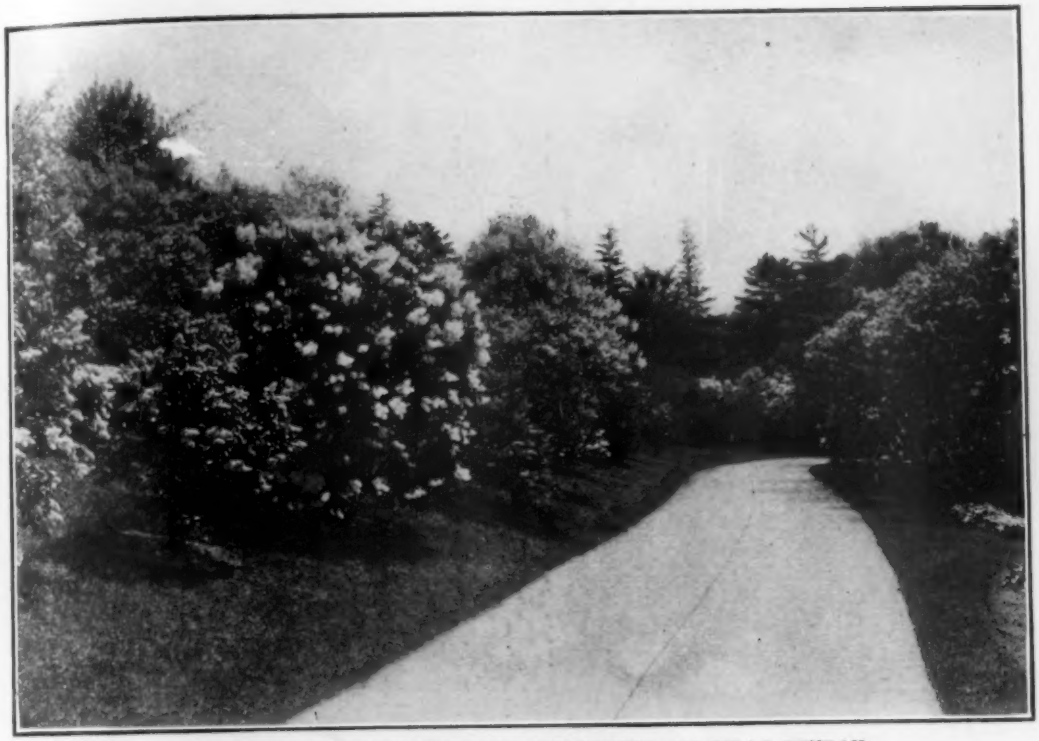
Municipal Airport Opened at Saint Paul

SAINT PAUL, MINN.—This city has recently joined the growing list of municipalities in this country having municipal airplane landing fields. The site of this airport was acquired through the efforts of the Saint Paul Association in order to be ready for the use of the mail planes on the Chicago-Twin Cities route, which opened on June 7.

As regards location, the Saint Paul field is believed to be unsurpassed by any other municipal airport in the country. It is readily spotted from the air, as it borders a bend in the Mississippi River directly across the river from the heart of the business district and is about 2½ miles directly south of the white dome of the State Capitol, which can be seen from a great distance in the air.

The airport is also ideally situated from every commercial standpoint. It is only one mile from the Saint Paul Union Passenger Depot, the terminal of all trains entering the city, one mile from the railway terminal postal transfer station, a mile and a quarter from the main city post office, and a like distance from the leading hotels and business houses. Directly across the river to the east are the railway freight yards and the site of the city's river barge terminals, so that eventually freight or express shipments can be transferred from rail or water to air without the delay of long trucking.

As a possible location for manufacturing plants in the aircraft industry, sites in the vicinity of the airport offer many advantages. Railway lines run along the west boundary of the field from which spur tracks could be run to the plants; the use of the air field for demonstrations or tests would eliminate a large investment in field rental; ideal residential sections for factory employees



TWO SCENES IN HIGHLAND PARK, ROCHESTER, ON LILAC SUNDAY

could be found at a short distance by street car, bus, or auto; and the plants would be in easy reach of the railway depot, hotels, and business houses of the city—a convenience to prospective purchasers and others having business with the manufacturers.

The city has issued bonds for $295,000 for the development of the airport. All trees and hazards have already been removed, and two runways, one 300 feet wide and ¾ of a mile long from north to south, and the other 300 feet wide and ½ mile long from east to west, are now in use. These runways have been graded and sodded, and are marked with wide borders of crushed rock so as to be readily distinguished from the air. Further improvements are being planned, and hangars of whatever type is required for the planes using the airport will be built. The field has sufficient area so that when improvements are completed, planes will be able to land from any direction on more than ½-mile of level ground without hazards.

E. D. JENCKS,
Publicity Director, The Saint Paul Association.

State College Aids Civic Survey

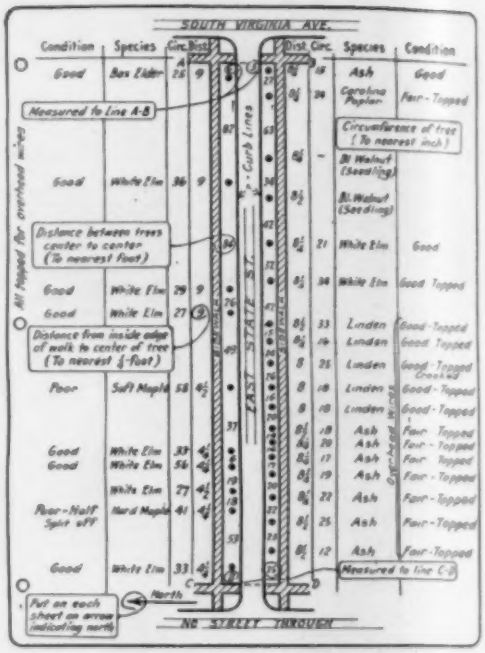
MASON CITY, IOWA.—The end and beginning of a most important movement in Mason City, fostered by the Chamber of Commerce and co-operating civic institutions, came recently with the naming by the Commissioners of a planning and zoning commission and the publication by the Engineering Extension Division of Iowa State College of its bulletin No. 76, described as "A Civic Survey of an Iowa Municipality"*.

The beginning of the project came when Rolland S. Wallis, then industrial engineer of the Engineering Extension Division, suggested that he would like to make a preliminary survey of a growing Iowa industrial city, the material so collected to form the basis for a publication which could guide other municipalities in their steps toward planning and zoning. The Mason City Chamber of Commerce invited Mr. Wallis to make this survey of Mason City and appointed a large group of committees as suggested by him, for aid in collecting a mass of material listing every physical aspect of the city. This material and the large group of maps made from it have now become the property of the newly created planning and zoning commission.

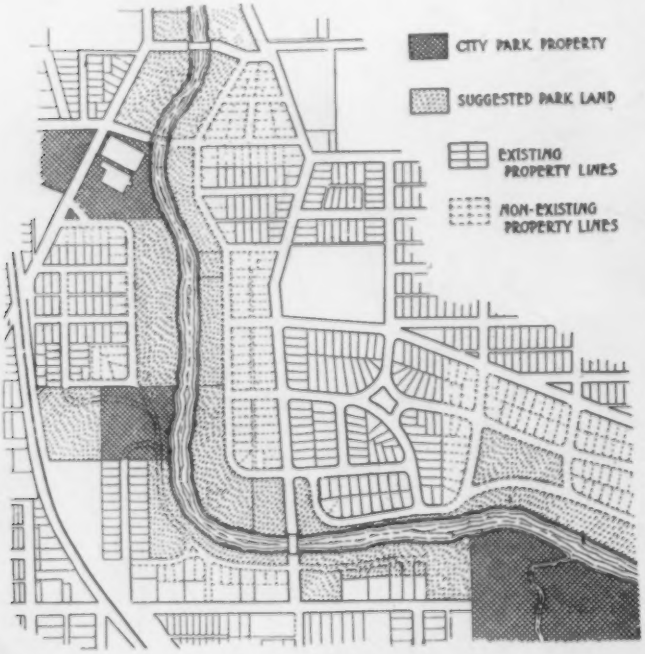
Definite results for the city include the knowledge given to the citizens and the sentiment created among them for planning and zoning; the appointment of the planning and zoning commission, ready to proceed with the work of passing the zoning ordinance and preparing plans for the development of the city; the large amount of maps and other material, worth thousands of dollars, turned over to this commission; and the valuable publicity given to the community through the publication of the bulletin, hundreds of copies of which will be distributed outside of Mason City.

This is the end of the movement as a volunteer project under the committees from the Chamber of Commerce working under the direction of Mr. Wallis. It is, however, only the beginning of real civic progress for Mason City under the

* See department of Municipal and Civic Publications in the issue of June, 1926, page 717.



FORM USED IN MAKING SURVEY OF STREET TREES IN MASON CITY



AN ILLUSTRATION OF MASON CITY'S MANY POSSIBILITIES IN PARKWAY DEVELOPMENT, WHERE BUILDING LOTS CAN BE PLATTED TO FRONT ON THE STREAMS

direction of the planning and zoning commission.

LESTER MILLIGAN,
Secretary, Mason City Chamber of Commerce.

Billboards Banished from Tennessee State Highways

NASHVILLE, TENN.—A firm stand against the billboard nuisance on the state highways of Tennessee has been taken by the State Department of Highways and Public Works. Acting under a law created by the Legislature in 1925 which makes it unlawful for anyone to erect a sign of any character on the right of way of all sections of the state highway system outside the limits of incorporated towns, the Department is conducting a continuous campaign against such encroachments on the roads under its jurisdiction.

The Department has long realized the detriment to the appearance of the highways of the endless array of billboards, as well as the confusion and annoyance to autoists resulting from the misleading distance markers, eating-place "stop" signs, etc., whose only excuse for existence was their advertising value. In many cases the signs interfered with safety, obstructing the view of the driver on curves and at intersections.

The first concerted move against the nuisance was made when December 14-19 was announced as Clean-Up Week on the state roads by the Department. For over a month prior to that time, notices appeared in newspapers throughout the state informing the owners of all advertising signs on the property of the state highway system that unless those signs were removed by Clean-Up Week, they would be destroyed. By the end of that week a remarkable change was evident in the appearance of the roads. A vast number of signs of all kinds were removed and destroyed, opening up new views of the landscape and increasing the safety of the traveler. But the campaign did not stop there. All new signs erected in violation of the law are being and will continue to be removed.

At some later date it is possible that still further steps will be taken toward the improvement and beautification of Tennessee highways, through the planting of trees, shrubbery and grass along the shoulders and edges of the state roads, but in the meantime the Department is determined to maintain a high standard of neatness through the elimination of all needless obstructions.

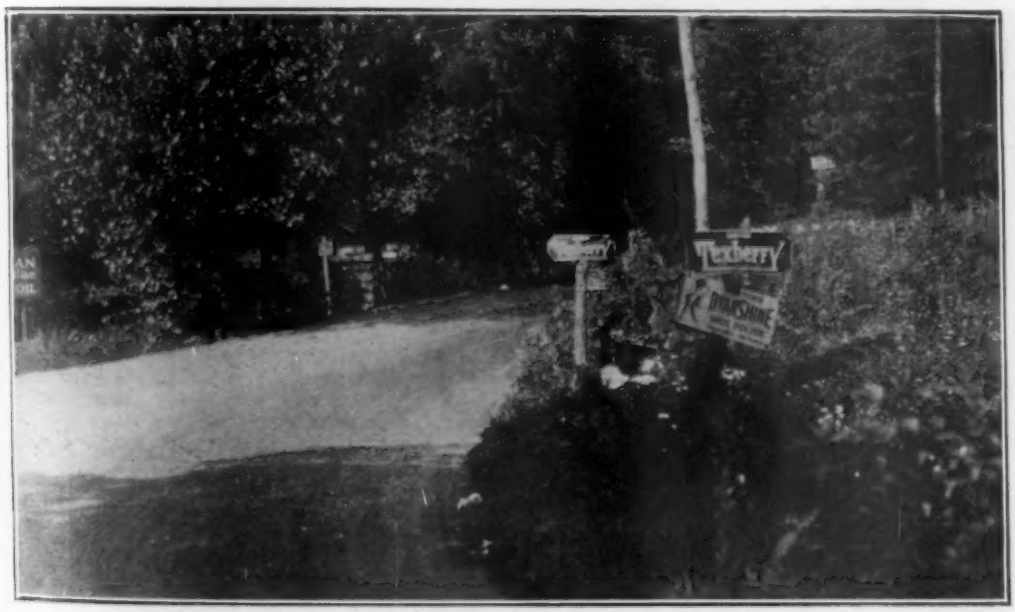
J. M. FARRAR,
Public Service Assistant, Department of Highways and Public Works.

Survey of Children Interested in Musical Instruments

JOHNSTOWN, PA.—A survey recently made by the Secretary of the Municipal Recreation Commission of Johnstown, assisted by Professor Ralph W. Wright, Supervisor of Music in the city schools, brought out some interesting statistics on the kinds of musical instruments that the children in sixteen public schools in this city would like to play and those that they are actually studying.

Of the 2,688 boys and 2,650 girls in the fourth to ninth grades, inclusive, in these schools, 2,195 boys and 2,005 girls expressed a desire to study some musical instrument, and 625 boys and 771 girls reported that they actually played or were learning to play some instrument. At the time of the survey, more children were learning to play the piano than any other instrument, the records showing that almost 700 were studying the piano; approximately 1,000 expressed a desire to play this instrument.

Harmonicas, however, no doubt predominate over the piano at the present time, as the result of an harmonica movement started just prior to the survey by the Municipal Recreation Commission. Less than 200 children reported as being able to play this instrument, but since that time it is believed that the number has run into the thou-



THESE SIGNS ON A TENNESSEE STATE HIGHWAY HAVE BEEN REMOVED BY THE STATE DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS

sands. Dealers in mouth organs have reported great increases in sales since the start of the movement furthered by the Commission.

In our campaign to promote the playing of this instrument, we have made it a point to caution the children against allowing others to use their harmonicas, and have instructed them to keep the instruments clean by letting running water rush through them and then drying the harmonica by placing it over a hot radiator or stove. We find that the children, accustomed to obeying health rules in school, are paying proper attention to our precautions in this connection, and that they also make it a habit to keep the harmonicas in the boxes provided with them, realizing that particles of dust or dirt are apt to clog the reeds.

The violin is quite popular, too, about 200 children now studying it and almost 700 expressing a desire to do so. Cornets, saxophones, trombones, clarinets, and other such instruments, are being taken up mostly by boys, the survey discloses.

The playing of musical instruments is being taught in the schools, and this is believed to have considerably increased the number of children who are ambitious to become accomplished musicians.

LEO J. BUETTNER,
Secretary, Municipal Recreation Commission.

Chamber Opens Broadcasting Studio

EAST ORANGE, N. J.—What we believe to be the first radio broadcasting studio maintained and operated by a chamber of commerce in this country was formally opened by the Chamber of Commerce of the Oranges and Maplewood on June 19. A studio party, at which the mayors of the communities covered by this organization and officials of the Chamber addressed the radio audience, was held in honor of this station's advent on the air. The addresses were followed by excellent music.

For the past year the Chamber has been using the radio for community advertising purposes, and has found this method so effective that it is now going into it on a more extensive scale. Our broadcasting plan includes a large amount of remote control, and microphones have been installed in all high schools in our territory, and at the Y. M. C. A., the women's clubs, and a number of the local country clubs, from which we expect to broadcast musical events.

Through the sale of time on the air to commercial concerns, it seems certain that the studio will not only pay for itself but will show a profit to the Chamber.

THOMAS F. BURLEY,
Secretary-Manager, Chamber of Commerce of the Oranges and Maplewood.

Naugatuck's Radio Community Night

NAUGATUCK, CONN.—A community-night program, sponsored by the Naugatuck Chamber of Commerce, was broadcast on June 11 from Station WTIC in Hartford. This program consisted of an address enlightening the listeners-in as to the attractiveness, industries, recreational advantages, etc., of this community, and well-diversified musical selections, with an opening number by the Naugatuck High School Orchestra.

Unique stickers, inviting the reader to tune in on this program, were used on correspondence by the townspeople during the week preceding community night, and on the evening itself people were reminded of the event by banners displayed on the cars that conveyed the artists from Naugatuck to Hartford, a distance of about thirty miles. Ideal weather conditions prevailed, which helped make the program a real success.

Judging from the telegrams received at the broadcasting station and from the many other comments that have since come to us, this radio night was one of the best items of community advertising that Naugatuck has ever had.

IRENE L. SQUIRES,
Secretary, Naugatuck Chamber of Commerce.

A Chance to Win a $1,000 Prize for a Civic Idea

"$1,000 *with medal to the individual who, in the opinion of the judges, has been responsible, during the calendar year* 1926, *for the creation, introduction or development of a distinctive contribution to the social, civic or industrial welfare.*"

This award will be made early in 1927 by the Harmon Foundation of New York. The judges, at the request of the Foundation, have been appointed by Survey Associates, Inc., the cooperative publishing society of social workers and others which bring out *The Survey Magazine*. They are Julian W. Mack, chairman, Judge, U. S. Circuit Court, New York; Jane Addams, head worker of Hull House, Chicago; Will W. Alexander, Director of the Commission on Inter-Racial Cooperation, Atlanta; Mary S. Gibson, from 1913 to 1923, Educational Commissioner, California State Housing and Immigration Commission, Los Angeles, and Rev. John A. Ryan, Director of National Catholic Welfare Council, Washington, D. C.

In determining the prize winner, it is announced that the jury will not attempt to measure achievement by magnitude or immediate results, but rather "by the potentiality of the project as a leavening influence in our American life." The award is not competitive in a literal sense, and, while nominations are invited, exclusively by mail, the judges will not be restricted to a choice from such nominations. Honorable mention with medal will be awarded to others who in the opinion of the judges merit such recognition. Address Jury, Harmon Survey Award 1, care Survey Associates, 112 East 19th Street, New York.

THE AMERICAN CITY has offered its cooperation in connection with this award to the extent of publishing, in its issue for January, 1927, a series of short articles on the achievements of the year which its readers may believe to be most worthy of the award. This means an opportunity for you:

(1) To render a distinctive service to your own city or state by the creation, introduction or development of a distinctive contribution to the social, civic or industrial welfare.

(2) To secure worth-while publicity for your community in THE AMERICAN CITY.

(3 To win the $1,000 prize—perhaps—or to secure an "honorable mention" medal.

If you contemplate entering the contest, and will write us to that effect at your convenience, the editors will bring the matter to your attention again towards the end of the year and ask you at that time if you have anything of interest for publication.

Population Estimates as of July 1, 1926

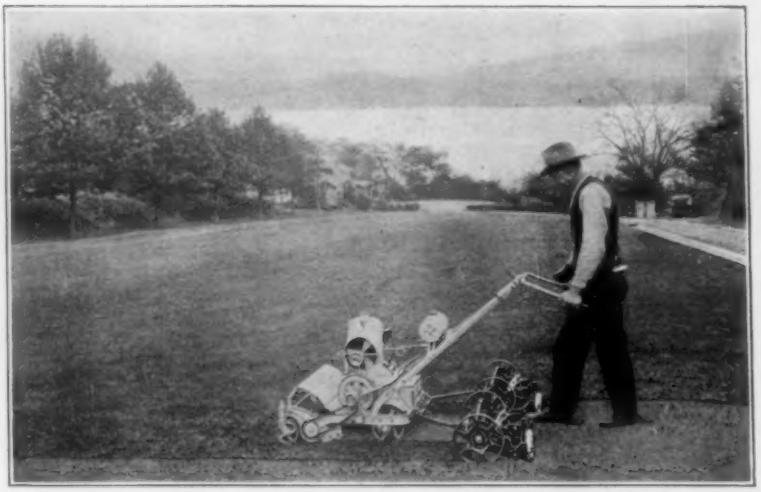
THE Department of Commerce has announced the estimated population, as of July 1, 1926, of those cities which had a population of over 30,000 in 1920.

These estimates were prepared in the Bureau of the Census and are based in most cases on the assumption that the annual increase of population since the census of 1920 has been the same as the average annual increase between 1910 and 1920. In those states, however, which took a state census in 1925, the estimates are based on the average annual increase between 1920 and 1925. Due allowance is made for any annexations or detachments of territory that may have taken place and of which the Bureau has been advised.

This method gives an estimate which, in the opinion of the Bureau of the Census, is approximately correct for the great majority of places. In a few cases, however, where there is reason to believe that owing to exceptional conditions of growth the figure thus obtained is far from correct, no estimates are made:

Municipality	Estimated Population
Alabama	
Birmingham	211,000
Mobile	66,800
Montgomery	47,000
Arkansas	
Little Rock	75,900
California	
Berkeley	67,800
Fresno	60,200
Long Beach	97,700
Los Angeles	**
Oakland	261,000
Pasadena	58,400
Sacramento	73,400
San Diego	110,000
San Francisco	567,000
San Jose	44,200
Stockton	48,500
Colorado	
Colorado Springs	*
Denver	285,000
Pueblo	43,900
Connecticut	
Bridgeport	**
Hartford	164,000
Meriden	36,600
New Britain	69,600
New Haven	162,000
Stamford	41,800
Waterbury	**
Delaware	
Wilmington	124,000
District of Columbia	
Washington	528,000
Florida	
Jacksonville	96,500
Pensacola	†
Tampa	102,000
Georgia	
Atlanta	**
Augusta	55,700
Columbus	45,000
Macon	59,200
Savannah	94,900
Illinois	
Aurora	40,900
Chicago	3,048,000
Cicero	65,400
Danville	37,600
Decatur	55,000
East St. Louis	72,300
Elgin	34,000
Evanston	45,100
Joliet	41,000
Moline	34,500
Oak Park Village	53,500
Peoria	82,500
Quincy	††39,131
Rock Island	41,000
Rockford	78,400
Springfield	64,700
Indiana	
East Chicago	47,300
Evansville	95,100
Fort Wayne	99,900
Gary	80,800
Hammond	52,300
Indianapolis	367,000
Kokomo	28,000
Muncie	43,600
South Bend	81,700
Terre Haute	71,900
Iowa	
Cedar Rapids	52,100
Council Bluffs	40,900
Davenport	†
Des Moines	146,000
Dubuque	41,600
Sioux City	78,000
Waterloo	36,900
Kansas	
Kansas City	117,000
Topeka	56,500
Wichita	92,500
Kentucky	
Covington	58,500
Lexington	47,500
Louisville	311,000
Louisiana	
New Orleans	419,000
Shreveport	50,500
Maine	
Lewiston	35,500
Portland	76,400
Maryland	
Baltimore	808,000
Massachusetts	
Boston	787,000
Brockton	†
Brookline town	43,900
Cambridge	122,000
Chelsea	48,200
Chicopee	43,200
Everett	42,500
Fall River	131,000
Fitchburg	44,200
Haverhill	†
Holyoke	60,400
Lawrence	93,500
Lowell	†
Lynn	104,000
Malden	52,400
Medford	49,700
New Bedford	†
Newton	54,700
Pittsfield	48,100
Quincy	63,000
Salem	42,900
Somerville	100,000
Springfield	145,000
Taunton	39,800
Waltham	35,700
Worcester	193,000
Michigan	
Battle Creek	43,500
Bay City	49,200
Detroit	1,290,000
Flint	137,000
Grand Rapids	156,000
Hamtramck	87,800
Highland Park	77,000
Jackson	59,700
Kalamazoo	54,500
Lansing	73,200
Muskegon	44,300
Pontiac	49,800
Saginaw	73,300
Minnesota	
Duluth	113,000
Minneapolis	434,000
St. Paul	248,000
Missouri	
Kansas City	375,000
St. Joseph	78,400
St. Louis	830,000
Springfield	42,600
Montana	
Butte	43,100
Nebraska	
Lincoln	62,000
Omaha	215,400
New Hampshire	
Manchester	84,000
New Jersey	
Atlantic City	53,800
Bayonne	91,000
Camden	131,000
East Orange	61,700
Elizabeth	**
Hoboken	*
Jersey City	318,000
New Brunswick	38,900
Newark	459,000
Orange	35,800
Passaic	69,900
Paterson	143,000
Perth Amboy	48,100
Trenton	134,000
Union City	63,600
New York	
Albany	119,000
Amsterdam	35,000
Auburn	†
Binghamton	72,900
Buffalo	544,000
Elmira	49,000
Jamestown	44,300
Mount Vernon	51,900
New Rochelle	45,800
New York	5,924,000
Bronx borough	900,000
Brooklyn borough	2,240,000
Manhattan borough	1,877,000
Queens borough	764,000
Richmond borough	143,000
Newburgh	30,400
Niagara Falls	58,300
Poughkeepsie	35,800
Rochester	321,000
Schenectady	93,000
Syracuse	184,000
Troy	72,300
Utica	103,000
Watertown	33,100
Yonkers	116,000
North Carolina	
Charlotte	54,600
Durham	43,900
Greensboro	48,700
Wilmington	37,700
Winston-Salem	71,800
Ohio	
Akron	**
Canton	110,000
Cincinnati	411,000
Cleveland	960,000
Columbus	285,000
Dayton	177,000
Hamilton	42,800
Lakewood	59,500
Lima	47,700
Lorain	43,100
Portsmouth	39,800
Springfield	70,200
Toledo	294,000
Youngstown	165,000
Oklahoma	
Muskogee	32,500
Oklahoma City	**
Tulsa	133,000
Oregon	
Portland	**
Pennsylvania	
Allentown	94,600
Altoona	67,000
Bethlehem	64,400
Chester	70,400
Easton	37,400
Erie	**
Harrisburg	84,600
Hazleton	36,800
Johnstown	72,200
Lancaster	57,100
McKeesport	49,500
New Castle	50,700
Norristown borough	35,300
Philadelphia	2,008,000
Pittsburgh	637,000
Reading	114,000
Scranton	143,000
Wilkes-Barre	78,300
Williamsport	43,100
York	49,400
Rhode Island	
Newport	†
Pawtucket	71,000
Providence	275,000
Woonsocket	51,100
South Carolina	
Charleston	74,100
Columbia	41,800
Tennessee	
Chattanooga	72,200
Knoxville	98,800
Memphis	177,000
Nashville	137,000
Texas	
Austin	38,200
Beaumont	52,500
Dallas	200,000
El Paso	109,000
Fort Worth	159,000
Galveston	49,100
Houston	**
San Antonio	205,000
Waco	44,800
Wichita Falls	**
Utah	
Ogden	37,600
Salt Lake City	133,000
Virginia	
Lynchburg	30,500
Newport News	43,800
Norfolk	174,000
Petersburg	36,400
Portsmouth	59,900
Richmond	189,000
Roanoke	61,900
Washington	
Seattle	**
Spokane	109,000
Tacoma	106,000
West Virginia	
Charleston	50,700
Huntington	65,300
Wheeling	*
Wisconsin	
Green Bay	34,900
Kenosha	52,700
La Crosse	30,400
Madison	47,600
Milwaukee	517,000
Oshkosh	33,200
Racine	69,400
Sheboygan	34,000
Superior	*

* No estimate made; population decreased 1910 to 1920.
† No estimate made; population decreased 1920 to 1925.
** No estimate made; see explanation at head of table.
†† Special Census 1926, taken under the supervision of the Bureau of the Census.



Simplicity, Economical Operation Plus Dependability in the Model "L"

COLDWELL LAWN MOWERS—since 1867—have been known as dependable, economical machines. Some Coldwell hand mowers sold 35 years ago are still cutting lawns. Coldwell mowers require less sharpening and fewer repairs. As new developments have come along and have been tested and found worthy, they have been incorporated in Coldwell Mowers.

The Model "L", pictured above, "the park favorite", cuts a 25 inch swath and with the new gang units attached, it cuts a 60 inch swath—10 acres a day on one gallon of gasoline.

The new Electric Lawn Mower is *"as easy to operate as a vacuum cleaner"*. Propels itself and mows as it goes. Connects to any electric outlet on either alternating or direct current. Cuts a 21 inch swath—¼ acre an hour. Automatic friction reel keeps wire always taut and out of the way of the machine and the operator. Mower by Coldwell—Motor by General Electric—Timken Tapered Roller Bearings. Especially useful for small plots, boulevard parkways, etc. To interested executives we will be pleased, upon request, to send complete detailed information or, better still, ask your local Coldwell dealer to show it to you in action.

SINCE 1867

COLDWELL

DEPENDABLE LAWN *MOWERS*

Hand · Horse · Gasoline · Electric

COLDWELL LAWN MOWER COMPANY, NEWBURGH, N. Y., U. S. A.

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Secretarial Changes in Civic-Commercial Organizations

Since the Publication of the 1926 Edition of The Municipal Index

AN important feature of The Municipal Index for 1926 is a list which gives the name of the leading civic-commercial organization in each city of the United States having, according to the 1920 Federal Census, a population of 5,000 or more. For each organization the name of the secretary (or manager) is given.

For the convenience of users of The Municipal Index, the following list is published of secretarial changes among the organizations listed which have come to the attention of THE AMERICAN CITY since The Municipal Index went to press. Similar information for publication in future issues will be greatly appreciated by the editors of THE AMERICAN CITY. (Publication office—443 Fourth Avenue, New York City.)

Abbreviations Used in the Following Table

A. of C. . . . . Association of Commerce
Bet. B. Cl. . . . Better Business Club
B. M. A. . . . . Business Men's Association
B. M. Cl. . . . . Business Men's Club
B. of C. . . . . Board of Commerce
B. of T. . . . . Board of Trade
C. & C. A. . . . Civic and Commerce Association
Civic A. . . . . Civic Association
C. of C. . . . . Chamber of Commerce
Com. A. . . . . Commerce Association
Com. Cl. . . . . Commerce Club
Coml. C. . . . . Commercial Club
Imp. A. . . . . Improvement Association
M. A. . . . . Merchants' Association
Town Cnl. . . . Town Council
Y. M. B. L. . . . Young Men's Business League

Alabama
Huntsville . . . . . C. of C. . . Claud Demers, Sec.
Talladega . . . . . C. of C. . . H. H. Thornton, Sec.

Arizona
Bisbee . . . . . C. of C. . . Robert Hamilton, Sec.

California
Modesto . . . . . C. of C. . . Madge Ritter, Sec.
Santa Ana . . . . . C. of C. . . Geo. A. Raymer, Sec.

Colorado
Boulder . . . . . C. of C. . . Harry R. Cooke, Sec.

Connecticut
Bristol . . . . . C. of C. . . Louis A. Wheeler, Sec.
Norwalk . . . . . B. of T. . . Ernest E. Hopkins, Sec.
Seymour . . . . . C. of C. . . C. C. Cornforth, Sec.
Shelton . . . . . C. of C. . . Edward B. Ward, Sec.
Thompsonville . . B. of T. . . L. B. Van Doren, Sec.
Waterbury . . . . . C. of C. . . Walker Matteson, Sec.

Florida
Gainesville . . . . . C. of C. . . W. R. Hudspeth, Sec.
Key West . . . . . C. of C. . . J. V. Porter, Pres.-in-Charge

Georgia
Americus . . . . . C. of C. . . H. B. Woodlief, Sec.

Illinois
Canton . . . . . C. of C. . . R. W. Corwin, Sec.
Chicago Heights C. of C. . . L. D. Jones, Sec.
DeKalb . . . . . C. of C. . . O. G. Olwin, Sec.
Dixon . . . . . C. of C. . . H. W. Hellener, Sec.
Edwardsville . . . C. of C. . . E. N. Mayo, Sec.
Joliet . . . . . C. of C. . . Harold Welch, Sec.
Murphysboro . . . C. of C. . . John T. Kimball, Sec.
Rock Island . . . . C. of C. . . R. A. Jacobson, Sec.

Indiana
Greensburg . . . . C. of C. . . H. W. Cartee, Sec.
Jeffersonville . . . C. of C. . . F. W. Rodenheber, Sec.
Kokomo . . . . . C. of C. . . Mary E. Redmond, Sec.
Lebanon . . . . . C. of C. . . Frank O. Myers, Sec.
Michigan City . . C. of C. . . Wm. L. Shafer, Sec.
Portland . . . . . C. of C. . . A. E. Fulton, Sec.
Seymour . . . . . B. M. A. . . Clark B. Davis, Sec.
Shelbyville . . . . . Bet. B. Cl. Geo. E. Young, Sec.
Terre Haute . . . . C. of C. . . R. I. Pierce, Sec.

Iowa
Ames . . . . . C. of C. . . W. T. Davidson, Sec.
Dubuque . . . . . C. of C. . . O. A. Reynolds, Sec.

Kentucky
Bowling Green . . C. of C. . . W. C. Sumpton, Ac. Sec.
Frankfort . . . . . C. of C. . . W. W. Thompson, Sec.

Maine
Auburn . . . . . C. of C. . . S. O. Foss, Jr., Sec.
Belfast . . . . . C. of C. . . N. S. Donahue, Sec.
Houlton . . . . . B. M. A. . . A. L. Cotton, Sec.
So. Portland . . . . C. of C. . . Wm. A. Willard, Sec.

Maryland
Hagerstown . . . . C. of C. . . Mark Mellor, Sec.

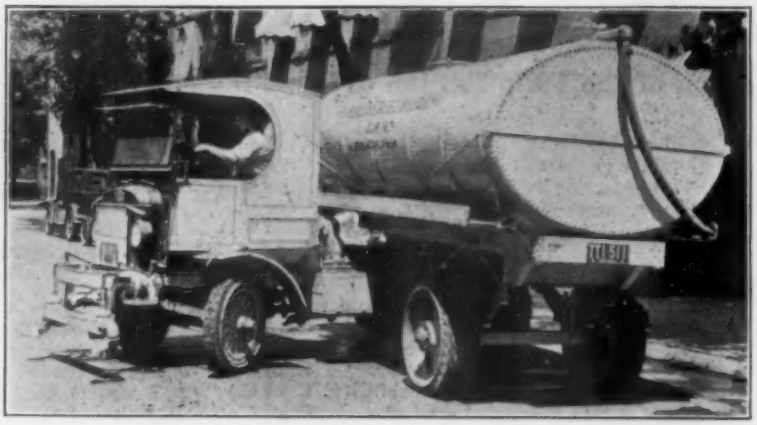
Massachusetts
Braintree . . . . . B. of T. . . Arthur L. Evans, Sec.
Chelsea . . . . . C. of C. . . Wm. R. Ferris, Sec.
Concord . . . . . B. of T. . . Thos. Hollis, Sec.
Ipswich . . . . . C. of C. . . Wm. J. Riley, Sec.
Milford . . . . . C. of C. . . John A. Colbert, Sec.
Quincy . . . . . C. of C. . . John F. Scott, Sec.
Ware . . . . . B. of T. . . J. R. Nolen, Sec.
Whitinsville . . . . C. of C. . . L. B. Randall, Sec.
Woburn . . . . . C. of C. . . P. P. Gallagher, Sec.

Michigan
Hillsdale . . . . . C. of C. . . D. G. Clancy, Sec.
Mt. Clemens . . . B. of C. . . M. H. Wheeler, Sec.
St. Joseph . . . . . C. of C. . . R. W. Davis, Sec.

Minnesota
Chisholm . . . . . C. of C. . . Alger R. Syme, Sec.
Mankato . . . . . C. of C. . . Geo. M. Davis, Sec.
Red Wing . . . . . C. of C. . . H. J. Davis, Sec.

Mississippi
Clarksdale . . . . . C. of C. . . Mrs. M. D. Martin, Sec.
Greenville . . . . . C. of C. . . Mrs. C. H. Williams, Sec.
Natchez . . . . . A. of C. . . M. C. Merrill, Sec.

Missouri
Carthage . . . . . C. of C. . . J. Ernest Shelby, Sec.
Fulton . . . . . C. of C. . . Will C. Hereford, Sec.
Independedce . . . C. of C. . . H. B. Owens, Sec.
St. Charles . . . . . C. of C. . . E. J. Warner, Sec.
St. Louis . . . . . C. of C. . . Wm. T. Findley, Sec.
Springfield . . . . . C. of C. . . Norma Short, Ac. Sec.



One of the City of Philadelphia's 5-ton Autocar chassis which are used as tractors with the flushing equipment illustrated. Of a fleet of 40 Autocars, 10 are furnished with this type flushing equipment and 30 with combination ash and rubbish dump bodies.

Direct Factory Branches or Affiliated Representatives in 67 cities

*Albany
*Allentown
Altoona
*Atlanta
*Atlantic City
*Baltimore
Binghamton
*Boston
*Bronx
*Brooklyn
*Buffalo
*Camden
*Canton, Ohio
*Charlotte
*Chester
*Chicago
*Cleveland
Columbus
*Dallas
Denver
*Detroit
*Erie
*Fall River
*Fresno
Harrisburg
*Indianapolis
Jacksonville
*Jersey City
*Lawrence
*Los Angeles
*Memphis
Miami
*Newark
*New Bedford
*New Haven
*New York
*Norfolk
*Oakland
Orlando
*Paterson
*Philadelphia
*Pittsburgh
*Providence
*Reading
*Richmond
*Rochester
*Sacramento
*San Diego
*San Francisco
*San Jose
*Schenectady
Scranton
Shamokin
*Springfield
*St. Louis
*Stockton
*Syracuse
Tampa
Trenton
*Washington
West Palm Beach
*Wheeling
Wilkes-Barre
Williamsport
*Wilmington
*Worcester
York

* Indicates Direct Factory Branch

Autocar Trucks Flush Philadelphia's Streets

THE Bureau of Street Cleaning of the City of Philadelphia has a country-wide reputation for progressiveness and efficiency. Scarcely a day goes by on which the Bureau does not receive requests from other cities for information as to how its work is carried on.

A few months ago, the Department purchased a fleet of 40 4-cylinder Autocars, ten of which are used as tractors for hauling 2,750-gallon semi-trailer flushers. The Autocar is particularly advantageous for this work because the standard Autocar chassis is as short as, or shorter than, any specialized tractor unit made.

The Autocar chassis, therefore, can be used alternately as a truck or as a tractor with a trailer without making any change in the chassis. The City of Philadelphia has already discovered this Autocar advantage, for during the snowstorms of last winter the trailers were removed and the trucks were fitted with snowplows.

The Autocar Company
ESTABLISHED 1897
Ardmore, Pa.

Autocar

Nebraska

Kearney	C. of C.	Wallace Thornton, Sec.
Nebraska City	C. of C.	Val Keyser, Sec.
North Platte	C. of C.	E. C. Kelso, Sec.
Scotts Bluff	C. of C.	Claude Trickett, Sec.
York	Coml. C.	A. Y. Shackley, Sec.

New Jersey

Englewood	B. of T.	Alfred J. Tipping, Sec.
Hoboken	C. of C.	R. D. Bloom, Sec.
Nutley	C. of C.	H. Romayne Peck, Sec.
Pennsgrove	C. of C.	C. C. Cavenaugh, Sec.
Rahway	B. of T.	R. W. Elliott, Sec.
W. New York	B. of T.	G. O. Pierce, Sec.

New York

Dunkirk	C. of C.	D. J. O'Connor, Sec.
Herkimer	C. of C.	*E. D. Bevitt, Sec.
Hudson	C. of C.	S. R. Putnam, Sec.
Newark	C. of C.	Carlton F. Smith, Sec.
Oneonta	C. of C.	W. W. Capron, Sec.
Port Chester	C. of C.	W. A. Staubus, Sec.
Saranac Lake	C. of C.	Geo. B. Carman, Sec.
Schenectady	C. of C.	Albert J. Horn, Sec.

North Carolina

Henderson	C. of C.	W. E. Jones, Sec.
Kinston	C. of C.	Plato Collins, Sec.
Lexington	C. of C.	D. L. Casey, Sec.
Reidsville	C. of C.	E. G. Anderson, Sec.
Thomasville	M. A.	Frank D. Jones, Sec.
Washington	C. of C.	C. A. Flynn, Sec.

Ohio

Ashland	C. of C.	Robt. P. Haines, Sec.
Athens	C. of C.	C. M. Gill, Sec.
Bellaire	C. of C.	D. Spotswood, Sec.
Bowling Green	Coml. C.	J. N. Easley, Sec.
Cambridge	B. of T.	E. D. Shively, Sec.
Dayton	C. of C.	Wayne G. Lee, Sec.
Defiance	Com. Cl.	Ralph W. Peters, Sec.
Dover	C. of C.	Joseph Fried, Sec.
Elyria	B. of T.	E. J. Fellow, Sec.
Kenmore	C. of C.	M. J. Carrillon, Sec.
Logan	C. of C.	M. G. Harbaugh, Sec.
Marion	C. of C.	M. P. Kelly, Sec.
Mt. Vernon	C. of C.	Bernard Jaeger, Sec.
Niles	C. of C.	C. C. McConnell, Sec.
Painesville	C. of C.	L. L. Dixon, Sec.
St. Bernard	B. M. Cl.	Frank J. Schwab, Sec.
Shelby	C. of C.	C. L. Beal, Sec.
Springfield	C. of C.	A. M. McKnight, Sec.
Toledo	C. of C.	Benj. H. Bonnar, Sec.
Troy	B. M. A.	Guy Laundrey
Urichsville	B. of T.	W. L. Armstrong, Sec.
Wellston	C. of C.	B. F. Wills, Sec.
Wooster	B. of T.	Neal Bowman, Sec.

Oklahoma

Ada	C. of C.	J. C. Hynds, Sec.-Mgr.
Blackwell	C. of C.	Cyrus A. Tunnell, Sec.
Cushing	C. of C.	C. G. Young, Sec.
Drumright	C. of C.	L. E. Shanks, Sec.
Guthrie	C. of C.	L. A. Hutchins, Sec.
Muskogee	C. of C.	C. Willeford, Gen. Sec.

Oregon

Baker	C. of C.	W. E. North, Sec.
Corvallis	C. of C.	W. A. Reid, Sec.
Portland	C. of C.	Chriss A. Bell, Sec.

Pennsylvania

Braddock	C. of C.	T. A. Haish, Sec.
Bristol	B. M. A.	C. A. Dougherty, Sec.
Coatesville	Imp. A.	F. J. Greenfield, Sec.
Conshohocken	C. of C.	John J. Kehoe, Sec.
Coraopolis	C. of C.	Chas. W. Roll, Sec.
DuBois	C. of C.	B. D. McCreight, Sec.
Duquesne	B. M. A.	Earl Dambaugh, Sec.
Elwood City	C. of C.	T. C. Foley, Sec.
Haverford Twp.	C. of C.	V. A. Hengst, Sec.
Jeannette	C. of C.	Paul Euwer, Sec.
Lehighton	C. of C.	Howard Seabolt, Sec.
Lewiston	C. of C.	C. H. Hoffman, Sec.
McKeesport	C. of C.	G. D. Theleen, Sec.
Mahanoy City	Civic A.	Russel Forster, Sec.
Midland	B. M. A.	D. T. Daugherty, Sec.
Plymouth	C. of C.	Jas. J. Shanley, Sec.
Reading	C. of C.	Edw. R. Hintz, Sec.
Rochester	C. of C.	M. E. Phillis, Ac. Sec.
Wilkinsburg	B. M. A.	T. C. Mock, Sec.
Wilmerding	B. M. A.	J. Clarke Flude, Sec.
Winton	Town Cnl.	John McGurel, Sec.

South Carolina

Florence	C. of C.	Lyle Ormsbee, Sec.
Orangeburg	Y.M.B.L.	L. S. Wolfe, Sec.
Sumter	B. of T.	R. B. Waters, Sec.

Tennessee

Jackson	C. of C.	Kathleen Nichols, Sec.
Johnson City	C. of C.	B. G. Gildersleeve, Sec.
Memphis	C. of C.	C. M. Anderson, Mgr.

Texas

Amarillo	C. of C.	O. C. Goodwin, Sec.
Bonham	C. of C.	C. R. Inglish, Sec.
Brownwood	C. of C.	G. D. Crabtree, Sec.
Denison	C. of C.	C. W. Graham, Sec.
Denton	C. of C.	G. R. Warren, Sec.
Galveston	C. of C.	J. W. Davis, Sec.-G. M.
McAllen	C. of C.	F. H. Dismuke, Sec.
Navasota	C. of C.	R. A. Harkey, Sec.
Orange	C. of C.	C. I. Moore, Sec.
Taylor	C. of C.	S. M. Patterson, Sec.
Terrell	C. of C.	E. H. Lilly, Sec.

Virginia

Newport News	C. of C.	M. Barham, Ac. Sec.

Washington

Centralia	C. of C.	H. Taylor, Exec. Sec.
Tacoma	C. of C.	T. A. Stevenson, Sec.
Wenatchee	C. of C.	C. Hunter Martin, Sec

W. Virginia

Clarksburg	C. of C.	N. R. Garland, Sec.
Williamson	C. of C.	Geo. A. Cooper, Sec.

Wisconsin

Neenah	B. M. A.	Wilbur Sparks, Sec.
Superior	C. & C. A.	Myrtle Smith, Ac. Sec.

Resignations Reported

In addition to the positions already filled, as listed above, resignations have been reported from the following cities. No information as to the filling of these vacancies has been received by THE AMERICAN CITY up to June 15, 1926, when the list was compiled. The organization in each case is the one listed in the 1926 Municipal Index.

Fort Smith, Ark.	Findlay, Ohio
Oelwein, Iowa	Mt. Vernon, Ohio
Bowling Green, Ky.	Salem, Ohio
Lafayette, La.	Wash. Court House, O.
Shreveport, La.	New Castle, Pa.
Old Town, Maine	Rochester, Pa.
Portland, Me.	Yankton, S. Dak.
Malden, Mass.	Cleveland, Tenn.
Hancock, Mich.	San Angelo, Texas
Port Huron, Mich.	San Antonio, Texas
Springfield, Mo.	Fairmont, Va.
Ashtabula, Ohio	Newport News, Va.
Bellevue, Ohio	Superior, Wis.

* Is also Sec. of Rome, N. Y., C. of C.

for Economical Transportation

CHEVROLET

Only Chevrolet gives you this for $550

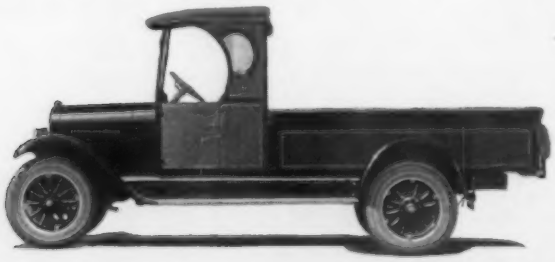
Chassis only—fob Flint Mich

No other truck offers so many quality features at such a remarkably low price. Its modern design and sturdy, special truck-type construction give definite assurance of low up-keep and economical operation.

If your business requires a rugged, dependable, thrifty one-ton truck, see your nearest Chevrolet dealer. He will gladly show you why Chevrolet trucks cost less to own and to operate.

CHEVROLET MOTOR COMPANY, DETROIT, MICH.

Division of General Motors Corporation



Quality Features found only in Chevrolet at these Low Prices

Easy gear-shifting, with 3-speed control. Disc-clutch of latest improved design.

Valve-in-head motor that delivers more power and miles per gallon than any other truck engine of equal size.

Positive motor lubrication by a combined pump and splash system.

Positive cooling in all weather by a water pump and extra-large Harrison radiator.

Positive, reliable, semi-reversible steering control.

Extra-large, equalized brakes—12⅜-inch diameter drums.

Big, oversize rear axle with spiral-cut, bevel gears.

Semi-elliptic steel springs—88% of wheelbase.

Full length, 177-inch, deep channel steel frame, rigidly braced.

Alemite lubrication.

½-ton chassis, $395

f.o.b. Flint, Mich.

CHEVROLET

ONE TON **TRUCKS** HALF TON

World's Largest Builder of Gear-shift Cars

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Municipal Accounting and Finance

Conducted by Francis Oakey, C. P. A.

Member of the Firm of Searle, Oakey & Miller, New York

Safeguarding the City's Treasury by Sound Accounting

THE city treasurer is the custodian and the receiving and disbursing officer of public funds. It is his duty to see that all moneys received by his office are recorded and properly accounted for and that disbursements are made only in accordance with due authority. He cannot carry out these duties without an accounting system designed in accordance with sound principles. In such a system, controls are established and constantly maintained over cash, uncollected taxes, investments, unexpended balances of funds and appropriations, and outstanding debt. By these controls, the possibility of errors or defalcations remaining undetected is reduced to the minimum; failure to collect and deposit all required income is automatically indicated; expenditures made without due authority are immediately apparent; the accuracy of the unexpended balances of funds and appropriations is readily proved; the regularity of the issue, redemption and exchange of bonds is easily established. In addition to this principle of control, the records must be clear and complete, providing promptly any information which may be required, and facilitating at the end of the fiscal period the preparation of the treasurer's report.

If the accounting system does not meet these requirements, the funds of the city are not adequately safeguarded, and the treasurer cannot be sure that he is discharging his responsibility.

Safeguarding Cash and Securities

As custodian of public funds, the treasurer has in his possession the cash balance and also, in some cases, the securities of invested funds such as the sinking fund or other special funds. This cash balance and these securities must be safeguarded. The first requisite is that the cash cannot be withdrawn from the bank nor the securities from the vault without due authority. The second requisite is that the banks selected shall be designated depositories and shall conform to required standards as depositories of public funds; the securities must be deposited in modern vaults operated under satisfactory methods of protection.

Means must be provided for ascertaining at all times that the cash balance is intact, on deposit in banks or on hand in the office, and that all the securities which have been purchased and not subsequently sold are on hand in negotiable form. This can be accomplished only by maintaining clear and complete records under complete control. A detailed record of each bank account must be kept and proved each day to the cash control. A list of the bank balances must be reviewed each day to determine the proper distribution of deposits and to prevent the increase of balances beyond such limitations as may be prescribed by law.

The record of receipts and disbursements must be kept in detail, classified so as to show on the one hand the sources from which the receipts were derived and the funds to which they apply, and on the other hand the funds to which the disbursements are to be charged. There must be a detailed record of investments showing in respect to each security all pertinent facts, and this record must be kept both in cost and par value and proved on both bases to the control at least once a month. There must be a complete file of documents supporting the record of investments and substantiating the accuracy and regularity of every transaction.

There are, then, two fundamental requirements in a system of accounting for cash and securities—the first is complete control, and the second clearness and completeness of detailed records.

If the methods of accounting do not conform to the standards which have been described, cash and securities are not safeguarded and the

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AMERICANS SHOULD PRODUCE THEIR OWN RUBBER... Harvey S. Firestone

Another Tribute to Gum-Dipping

"The Ahrens-Fox Engine has been in commission since 1916 and up until February, 1926, ran on solid tires, then was changed to Firestone Gum-Dipped Heavy Duty Pneumatics. The men on this engine say that riding on pneumatics is as different as stepping from a jolt wagon to a Pullman car. It also protects the engine and the various mechanism connected therewith from any serious injuries by means of smooth travel."

S. F. Hunter, Chief of Fire Department, Springfield, Ohio.

Gum-Dipping—the Extra Firestone Process—largely accounts for the extra mileage those big Firestone Heavy Duty Pneumatics for fire apparatus deliver. Every fiber of every cord is insulated with rubber. The destructive effects of heat are overcome because friction is greatly minimized.

The special Firestone Non-Skid tread grips the road, giving unfailing control through all hazards of speed in congested traffic, on suburban boulevards and in the small towns and country. Another factor for safe, dependable service is the Firestone Steam-Welded Tube—an endless, air-tight unit.

See your Firestone dealer for facts about the fire-fighting service built into these tires and tubes.

MOST MILES PER DOLLAR

The Mark of Quality

Firestone

HEAVY DUTY PNEUMATICS FOR FIRE APPARATUS

door is open to defalcation or at least to serious error which may result in loss.

Safeguarding Collections

One of the most important requirements in the operation of a treasury is the provision of methods for determining that all cash received is recorded and properly accounted for. The treasurer receives cash from various sources, the chief of which are:

1. From the tax collector or from other departments which collect revenues
2. From interest on bank balances
3. From income on investments
4. From individuals, firms or corporations—the money to be held in trust for various purposes
5. From the state for schools or other purposes

The record of cash receipts must be kept in such a way that the totals received from each source may readily be arrived at for purpose of verification. In the case of interest on bank balances and income on investments, the treasurers' discretion affects the amounts to be received; in all other cases, however, he merely accepts and accounts for the amounts transmitted to him.

Receipts from the tax collector or from other departments should be verified by comparison with the records of other departments or by advices received therefrom. The same method of verification may be used in the case of receipts from individuals, firms, corporations, and state.

In the case of interest on bank balances, it is the duty of the treasurer to obtain the highest rate possible which is consistent with safety. The amounts received must then be verified by calculation—for which there is a simple method.

Special methods must be provided to safeguard income on investments. It must be ascertained that all required income on the investments held is collected and deposited in bank. This is accomplished by a controlling account which indicates immediately whether or not all coupons due on bonds held have been cut and deposited. Thus the possibility of error or defalcation in coupon interest remaining undetected is eliminated.

The importance of sound methods for controlling and recording receipts cannot be overstated, since it is the receipts which are most subject to error or most easily manipulated.

Disbursing Public Funds

In government affairs the audit of claims before rather than after payment is a well-accepted principle. The work of auditing is usually performed by the comptroller or auditor, so that the warrants of this officer constitute orders on the treasurer to pay. The treasurer is not an auditor, and any attempt on his part to audit the claim to which a comptroller's warrant relates is duplication. But the treasurer must see that the warrants received by him are genuine, properly drawn, and signed by duly constituted authority. Having performed this duty, he should countersign the warrants and designate the banks on which they are to be drawn. The warrants thereupon become checks and should be registered in the bank accounts, the totals entered in the record of cash disbursements, and the warrants then transmitted to the payees.

It is essential that the record of cash disbursements be clear and complete, and classified so as to distinguish between the funds to which they are chargeable. The total must be arrived at daily for proof to the records of the comptroller.

Accounting for Public Debt

There is great risk involved in issuing bonds. Coupon bonds are placed by the promissor in the hands of the public without discrimination; title passes by delivery; the holders in due course are not known; to the promissor there is the constant risk of redeeming or receiving in exchange the counterfeit or stolen coupon bond—there is even the risk of redeeming the same bond twice. In the case of registered bonds, the promissor undertakes to designate or identify and thus protect the owner—a serious responsibility, which involves the risk of loss through negligence or error.

An engraver of undoubted responsibility having been selected, and a bond of the highest workmanship and of distinctive design having been obtained, the foundation of safety consists in sound accounting. It is essential that a complete accounting of all bonds engraved be obtained from the engraver. The next step is to establish a control over the total issue—the unissued bonds, and the issued bonds, both registered and coupon. In this control a record of the bond numbers is essential. There must be a complete record of bonds issued and of the proceeds received, supported by all bids, both successful and unsuccessful, and the correspondence and statements relating thereto. Coupons on unissued bonds should be cut when due and canceled. Bonds redeemed must be examined to ascertain that they are genuine and have not been redeemed before; they should then be canceled and either filed in numerical order or the numbers recorded. Bonds received in exchange must be examined

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The "Why"

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IT is easy to explain the reliability of Tarvia delivery service.

In the first place, The Barrett Company has a greater number of distributing points for road building materials than any other manufacturer.

Secondly, The Barrett Company's unequalled facilities (plants, organization and equipment) insures prompt delivery from these distributing points.

As a result—

Road officials get Tarvia how they want it, where they want it and when they want it.

to ascertain that they are genuine. When bonds are canceled, care must be taken to see that the cancellation is complete; this applies to coupons as well.

There must be a clear and complete chronological record of bonds redeemed, exchanged, and registered. A ledger of registered bondholders must be kept and frequently balanced with the control. Coupons paid must be immediately canceled and sorted in numerical order and the numbers compared with those previously paid, to detect possible counterfeits. The work of handling bonds and coupons and keeping records relating thereto must be delegated to certain persons to fix responsibilty.

These are some of the main essentials for safeguarding the issuance, redemption, registration, and exchange of bonds. As in all other phases of treasury work, the chief safeguard is control.

The Municipal Bond Market

By Sanders Shanks, Jr.

Editor of *The Bond Buyer*

THE aggregate of state and municipal bond issues floated during the first half of this year shows a moderate reduction in comparison with the corresponding period in 1925 and 1924. Present indications are that the figures for the full year 1926 will be at least proportionately smaller than those of recent years.

The first half of 1926 was a period of steadily advancing municipal bond prices. However, the advance has been entirely in keeping with the rest of the securities market and in contrast with the spring of 1925, when prices were advanced rapidly by an excited dealers' market only to react sharply in the summer and early fall.

Two outstanding developments of the first half-year period were the collapse of the Florida real estate boom, which is reflected in substantially lower prices paid for Florida municipals, and the U. S. Supreme Court's Archer County decision, casting doubt upon the validity of Texas road bonds and temporarily closing the investment markets to issues of that description.

The subjoined list includes the more important offerings of the month up to June 16. The state of New Jersey has announced that it will offer on June 22 $7,000,000 4¼ per cent bonds.

IMPORTANT MUNICIPAL BOND SALES IN JUNE

Amount	Issue	Maturity	Rate %	Yield %
$2,345,000	Albany, N. Y.....	1927-66	4¼	4.01
1,800,000	Maryland	1929-41	4½	4.03
7,682,000	Buffalo, N. Y.....	1927-56	4¼	4.07
4,000,000	Virginia	1930-37	4¼	4.08
550,000	Harrisburg, Pa., Sch. Dist.	1931-56	4¼	4.11
607,000	Elizabeth, N. J.....	1932	4¼	4.15
3,200,000	Chicago, Ill., South Park Dist.	1926-46	4	4.17
578,000	Reading, Pa.....	1934-50	5	4.23
575,000	Irondequoit, N. Y...	1931-53	4½	4.31
800,000	New Orleans, La....	1930-67	4½	4.39
1,007,000	Memphis, Tenn.....	1927-55	4 & 4½	4.45
3,812,000	Los Angeles, Calif., City and High Sch. Dists.	1926-64	5	4.52
2,400,000	Newport News, Va..	1927-61	4¼	4.70
1,400,000	Harrison Co., Miss..	1927-51	5½	5.37
750,000	Halifax Hospital Dist., Fla.	1931-55	6	6.18
800,000	Dade Co., Fla., Spec. Tax Sch. Dist. No. 14 (Miami)	1929-53	6	6.24
734,000	Sanford, Fla.....	1927-36	6	6.39

National Capital Park and Planning Commission Appointed

ON April 30, President Coolidge signed the Federal City Planning Bill (previously mentioned in THE AMERICAN CITY for May, 1926, page 555). The new law provides for the appointment of a National Capital Park and Planning Commission to consist of "four eminent citizens, well qualified and experienced in city planning," and seven ex officio members. On May 19 the President announced that he had appointed as citizen members Frederick Law Olmsted, of Brookline, Mass.; Frederic A. Delano, of Washington, D. C.; J. C. Nichols, of Kansas City, Mo.; and Milton B. Medary, of Philadelphia, Pa.

The seven ex officio members are Brig.-Gen. Edgar Jadwin, Chief of Engineers, U. S. A. (who takes the place of General Harry Taylor, resigned); Colonel James Franklin Bell, Engineer Commissioner of the District of Columbia; Major U. S. Grant, 3d, Director of Public Buildings and Public Parks, who is Executive and Disbursing Officer of the Commission; Colonel William Greeley, Chief of the Forest Service; Stephen T. Mather, Director of the National Park Service; Senator Arthur Capper, Chairman of the Senate Committee on the District of Columbia, and Representative Frederick N. Zihlman, Chairman of the House Committee on the District of Columbia.

The Commission is charged with the duty of preparing, developing and maintaining a comprehensive, consistent and coordinated plan for the National Capital and its environs. It is authorized to employ a Director of Planning.

Much credit for the enactment of this legislation, which will have an important effect on the future development of the District of Columbia and its environs, belongs to the American Civic Association, and to the various local Committees on the Federal City which it has organized.

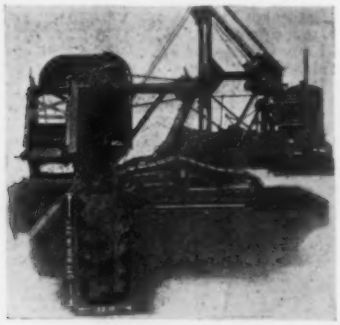
3 Classes of Digging On Which Barber-Greenes Cut Costs

Town and City Digging

In practically every town there are trees and poles that a ditcher must dodge.

Recently, in Florida, a Barber-Greene pulled out of a ditch—dodged around a pole—and dug back to digging depth in eight minutes.

You can read in *Cutting Mains and Services* of other instances where Barber-Greenes have saved money by being fast on their feet.



Service Laterals and Short Runs

The Barber-Greene Vertical Boom digs straight down. In mid-winter in Chicago suburbs, a Barber-Greene machine is used for cutting services, starting in within 18 inches of the house, cutting a full-depth ditch across the lawn, jumping the sidewalk, and cutting a full-depth ditch from there to the main. And the Barber-Greene is fast on its feet. It moves quickly from one lateral or job to another.

***Cutting Mains and Services* tells the complete story of lower costs on short run digging.**

Cross Country Work

The Barber-Greene Adjustable has digging speeds ranging from one and one-half to ten feet per minute. Using the ten-feet-per-minute speed it has averaged 5,000, 6,000 and even more lineal feet per day on pipe line work.

Full length crawlers hold the Barber-Greene to line—and carry it through soft spots without planking. And the Pipe Line Special rides the pipe.

All these things are shown in detail in *Cutting Mains and Services*. Ask for a copy.

Overload Release Prevents Damage

When the Barber-Greene strikes a hidden obstruction no harm is done to either the machine or what it hits.

How the Barber-Greene Overland Release saves money for Barber-Greene owners is shown in *Cutting Mains and Services*. May we send you a copy?

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Portable Belt Conveyors Self Feeding Bucket Loaders

Coal Loaders . . . . . Automatic Ditch Diggers . . . . . Coal Feeders

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Factors in Rate Determination—II

Operating Costs

OPERATING costs are the expenses which enter into a company's operations. They consist of operating expenses, taxes, and uncollectible revenue. As pointed out in the June issue, the operating costs—or operating revenue deductions, as they are sometimes designated—are the most important group, from the standpoint of size, of all items entering into the determination of rates. Taking the illustration which appeared in the June issue, and which approximates very closely the actual status in the case of many gas companies of the size referred to, we note that operating costs were $1,000,000 and return on the investment $292,000. Expressed in percentages, operating revenue deductions represented 77.4 per cent of the total rate or charge for gas.

Fluctuations in prices of commodities entering into the operating costs have a very marked effect on the adequacy of the rate, and a very immediate one. For example, if the price of coal rises sharply, the cost of operations of an electric company is bound to show a corresponding increase within three months' time, for coal stocks are usually limited by storage capacity to about three months' supply. Changes in labor costs are reflected even more quickly.

This is in sharp contrast to the effect upon rates of rising or falling costs of construction and equipment. To illustrate, let us assume a 50 per cent increase in average prices of those commodities which enter into operating costs. If operating costs were $1.00 prior to the rise, there would be then required for this purpose $1.50, and the proper rate would be $1.80 ($1.50 for operating expenses and taxes, and 30 cents for return on investment). The $1.30 rate would fall short by 20 cents of covering the cost of operations. Contrast therewith a 50 per cent increase in the rate base. In place of 30 cents we have 45 cents as the amount for return on investment, and the adequate rate becomes $1.45.

Original Cost Versus Reproduction Cost

This relationship is important to bear in mind, because in recent years, because of the new and higher price level, the question of whether original cost, reproduction cost new, or any other figure, is the proper measure of value of property, has received far more attention than the subject warrants. In most proceedings, months of time, numerous exhibits and thousands of pages of testimony are devoted to the attempt on the part of companies to have the regulatory body or court find a high valuation, and on the part of the public, strenuous efforts are made to keep down the amount, and comparatively little attention is paid to the operating costs, which are the more important because of their greater effect on the rate. Furthermore, particularly in the case of electric and telephone properties, because of the frequent replacement of equipment by more modern and more efficient types, the difference between original cost and reproduction cost at present prices is very small, and the effect on the rates correspondingly little. Even in the case of gas companies, the difference is not very great, because in most cases where a gas company is enjoying steady growth there will have been built at high price levels obtaining during and after the war a substantial proportion of the present equipment in the plant. In the case of a gas company operating in New York City which was involved in litigation in 1925, it appeared that over 64 per cent of the plant was built at prices obtaining in 1925, or at the considerably higher prices which prevailed from 1919 to 1923. In the litigation over telephone rates in New York State conducted before the Public Service Commission, it was shown that the difference between reproduction cost new and original cost of the telephone properties amounted to only 13½ per cent—and on one portion of the inventory the book cost exceeded the reproduction cost.

With the stabilization in prices, and strong probability of a very slow but nevertheless definite decline in prices, the difference between actual original cost and reproduction cost new as of the date when the rate is determined, will entirely disappear. Equipment in most plants has but a comparatively short life and is bound to be replaced in from ten to twenty years. The rise in prices began over ten years ago, so that a good deal of the equipment ten years old or over—installed at low price levels—will be soon written out of the capital accounts of utilities and be replaced with equipment at present-day costs. The plant will then consist mainly of units installed during the war and subsequent thereto. We may even expect to find here and there utilities—especially telephone and electric companies—arguing for original cost as the proper measure of the rate base. This is pointed out to show that the

210 eight-hour days, *without a stop for repairs* is the record of a 5-ton GMC Truck which does duty as a street flusher in St. Joseph, Mo. *That's Reliability.*

These features insure unusual

Reliability

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The ability of GMC Trucks to haul their loads, day after day and year after year, *with a minimum loss of time* is the direct result of General Motors great engineering and manufacturing facilities, plus years of experience in truck building.

Improved wear-resisting, removable cylinder walls and positive high pressure lubrication to all bearing points in the engines; oversize transmission gears and shafts; oversize universal joints; oversize axles; pressed steel frames; springs of finer steel; electrical wires encased in wet-proof conduits:—

These are but a few of the reasons for the *unusual reliability* of General Motor Trucks.

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time, effort, and money being spent to arrive at a "fair value" is practically wasted, for what the companies have accomplished by their arguments recently will prove but a temporary victory.

Operating Methods and Management Efficiency

It would be of more lasting benefit for the general public, the consumers, and public utilities themselves, if more attention were centered on the operating methods and efficiency in management of the utilities and their operating costs. The matter of efficiency of operation is but lightly and superficially touched upon in most cases. In fact, courts (and to some extent commissions) frown upon any attempt to go into this phase of a rate investigation. Very little effort, for instance, is made by representatives of the public to point out where practical economies may be effected, where better methods can be adopted and where better forms of organization can be utilized.

One of the best means of testing the efficiency of any organization is to compare statistics of cost and other operating data of the utiliity under investigation with other utilities operating under similar conditions. It has been the experience of the writer that such attempts usually prove futile for two reasons: first, because companies will usually afford facilities to this end grudgingly, if at all; and, second, because most courts and commissions will not admit such evidence, on the ground that unless fraud is shown on the part of officers or directors their judgment as to such matters is binding—and courts or commissions cannot set up their judgment as against that of the officers or directors. Many items of cost whose amounts are subject to discretion vary widely as between similarly situated companies.

Little Inducement for Economic Operation

This comparison of operating costs is important because utilities have little inducement to operate as economically and efficiently as possible; no matter how high their costs are, they are practically guaranteed by law a return or profit above such cost. Two instances which are familiar to many people illustrate this point clearly. It was not until the New York Subway companies became involved in financial difficulties and the dream of a higher fare than five cents vanished, that they cut down labor costs by installing turnstiles at the stations and working out a system whereby one or two guards open and close the doors of an entire train. Similarly, one-man cars did not become popular until high costs and reduced earnings forced the change.

Records of the commissions disclose very few instances where companies were ordered to change either their operating methods or their equipment to obtain more efficient or economical operation. The only time that the commissions are apt to interfere is where the safety or the comfort of the public demands a change, as in the case of street railroads. There is no question but that a substantial reduction in rates could be brought about, coupled with an improvement in service, if commissions were to take the lead in instituting practical improvements. They are in an excellent position to make studies for the purpose of determining the best operating methods and the most efficient types of equipment, for they have full access to the plants of the companies under their jurisdiction. In rate investigations the representatives of the public should go thoroughly into this phase of the situation..

How a more economical result may be obtained where old equipment is scrapped and replaced by new equipment, may be seen from the following illustration. Let us compare two electric companies for which the data are taken from an annual report of a public service commission:

Company A uses 2.60 lbs. of coal for each kw. hr. generated; Company B uses 1.35 lbs. of coal for each kw. hr. generated; the difference is 1.25 lbs. of coal for each kw. hr. generated.

Company A generated 15,000,000 kw. hrs. of current. At $6 per short ton of coal the difference in coal cost in plant A over what it cost to produce a like quantity of current in plant B represents $56,000 per annum. Over a period of five years this amounts to $280,000. To scrap the old, inefficient generating equipment and provide for the undepreciated portion thereof (say $40.000) over a period of five years would require $8,000 annually. The additional depreciation of a more costly unit and a return on the additional investment would hardly exceed $10,000, leaving a net saving of about $38,000, which could be applied to a reduction in rates.

Major Items of Operating Costs

It may be well, in closing this article, to point out the major items under the head of operating costs. In most utilities, whether gas, electric, telephone, or street railway, labor is one of the largest single items of expense. Coal forms a big percentage of the cost of operations of electric and gas companies and street railways. Gas oil is a very big item of expense in the case of gas companies manufacturing water gas; taxes take quite a big share of the revenues of all utilities. The contracting for these items (except taxes) is therefore a very important job, for profits depend to a great extent upon the prices paid for those commodities. The public has a distinct interest in the contracts, for the rates for service follow closely the prices paid.

In the case of gas companies, salaries and wages, coal, oil and taxes amount to over 75 per cent of the operating costs; and for electric companies the salaries, wages, coal and taxes amount also to about 75 per cent of the cost of operations. A 20 per cent fluctuation in prices up or down in these items will affect operating costs as much as an 80 per cent variation in all other items.

BENJAMIN COHEN.

Items of Public Utility News

Is the Telephone Company an "Illegal Monopoly"?

WASHINGTON, D. C.—A thorough investigation of charges that the American Telephone and Telegraph Company is an "illegal monopoly," enforcing payment of exorbitant rates for telephone service, will be begun by the Interstate Commerce Commission as soon as evidence in the case instituted by the city of Boston has been submitted. Although Boston acted alone in making the charges, other cities are expected to join in its fight against the alleged monopoly by intervening in the case. The $9,000,000 boost in telephone charges in New York a few weeks ago has aroused opponents of rate increases to a fresh assault.

Rates charged the public for interstate long distance toll service are sweepingly attacked as "unreasonable" in an amended complaint submitted to the Commission by the Hub City. Toll rates throughout the country, as well as in the Boston area, are assailed on the ground

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The designers of Graham Brothers Trucks are alive to the fact that every business has its individual haulage problems.

An intensive study has therefore been made of the particular requirements of various industries—including your own—and truck bodies designed to fit the needs of more than 450 different kinds of business.

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We have valuable information concerning your haulage problems. It is yours on request.

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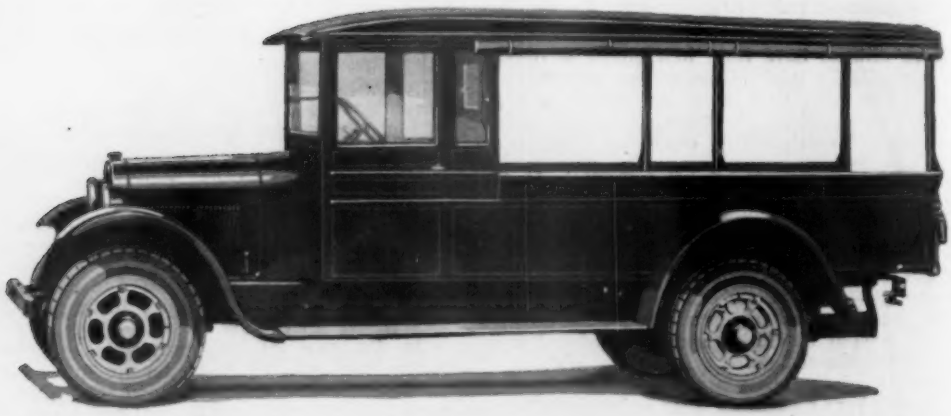

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THE AMERICAN CITY

that all these rates are closely connected. Violation of the Clayton Anti-trust Act also is charged, based on the alleged nation-wide control of telephone service and rates exercised by the parent company. That the Commission will probe deeply into the charge of "unreasonable" toll rates appears certain.

While the telephone company has fought the Commission's jurisdiction from many angles, the Commissioners feel sure of their power to control rates and service between the states.

How far the Commission will go in its action on the "illegal monopoly" charge will depend upon the extent to which initial evidence tends to establish the existence of a monopoly. Under the procedure already begun, the Commission must decide whether it is justified in itself issuing a formal complaint against the telephone company. Should this be done, it will be the first time the Commission has become the complainant against a corporation in charging violation of the Clayton Act. The telephone company and the city of Boston have agreed to submit memoranda of evidence in the case. When received, the Commission will make its examination to determine whether sufficient cause has been shown for it to make the same charge of monopoly which Boston has made. Hearings probably will be held in the early fall.

Lower Rates for Electricity and Gas

MEMPHIS, TENN.—The cost of cooking by electricity in Memphis, suburbs, and Shelby County was considerably reduced June 1, when the new rate of 3 cents per kilowatt-hour became effective as a result of a ruling of the Tennessee Public Utilities Commission granting the lower rate.

Under the former system a $3 per month service charge was added to the cost of electricity. The new rate removes this.

KINGSTON, ONT.—The Utilities Commission has reduced the price of gas from $1.70 to $1.60, with 10 per cent off. The new rate went into effect for the June account, and the Commission will inaugurate a campaign for the purpose of securing customers.

The Commission will also seek an interview with the Ontario Hydro-Electric Commission regarding a reduction in the rates for electricity.

RICHMOND, IND.—As a result of conferences of representatives of the Richmond Light, Heat and Power Company and the city of Richmond, a gas rate schedule of $1.30 per 1,000 cubic feet, a reduction of 5 cents in the prevailing rate, has been accepted.

A resolution approving the schedule is to be presented to the public service commission for ratification.

FLINT, MICH.—Lower gas rates will become effective in Flint as soon as a new schedule which has been filed with the Michigan Public Utilities Commission by the Consumers Power Company has been approved.

The revised schedule will give domestic users a reduction of 5 cents per 1,000 cubic feet of gas, which parallels a similar reduction allowed to industrial users last fall. Other optional rates for water heaters and house heating which are fixed on a sliding scale also offer a reduction which would make the total reduction in rates average about 6 per cent.

Special Sunday Street-Car and Bus Ticket

DES MOINES, IOWA.—Beginning Sunday, June 6, the Des Moines Street Railway Company put on sale for 25 cents a retainable ticket which entitles its holder to any number of rides on any number of lines throughout the day and night on Sundays. Whether the privilege will be extended to include holidays has not been decided, but it is intimated if the plan proves successful holidays will be included.

The tickets will be transferable from one person to another, and according to present plans will be in the hands of conductors only on Sundays. The conductor will not pick it up upon its presentation, but will return it to the passenger. It will be usable from 5 A. M. Sunday to the same hour Monday. Tickets will also be good on street-car bus lines. No transfers will be issued, as they will be unnecessary.

B. T. U. Requirements Reduced

MINNEAPOLIS, MINN.—The City Council recently voted to amend the gas ordinance to call for a reduction from 600 British thermal units to 550, and to change pressure requirements, so as to effect a saving for Minneapolis gas consumers of about 3 cents per 1,000 cubic feet, or approximately $105,000 a year.

City Engineer N. W. Elsberg, who told the Council the move will provide more efficient combustion, approved the ordinance.

Bus Companies to Be Taxed for Upkeep of Streets

BUFFALO, N. Y.—The City Council has directed the city law department to draft an ordinance requiring all bus companies engaged in passenger transportation over city streets to pay the city a percentage of their annual receipts to provide funds for the upkeep of pavements on streets over which the busses operate. In the event that the city law department rules such an ordinance illegal, the Council indicated it would amend all existing bus franchises to provide for the payment of the tax.

Reduction in Accidents

CALIFORNIA.—Three companies operating in California have reported a reduction in accidents during 1925 compared with the year previous:

The Pacific Electric Railway, Los Angeles, has indicated a reduction of 1,745 accidents of all classes in 1925, equivalent to 16 per cent less than during the preceding year.

The Los Angeles Railway reports a total number of accidents in 1925 of 20,244, against 23,303 in 1924, although car-miles operated in 1925 exceeded those of 1924.

The San Francisco Municipal Railway reported 3,101 accidents in 1925, compared with 3,209 in 1924.

Street-Railway Funds Loaned to City

DETROIT, MICH.—During April the Department of Street Railways loaned the city $1,663,698 on demand notes of the city bearing interest at 4 per cent. William M. Hauser, Auditor, made this fact public in presenting the financial statement of the department for the month.

The Department of Street Railways would receive only 3½ per cent on this money if it were left on deposit in the banks, while the city of Detroit would be compelled to pay from 4.10 per cent to 4.25 per cent if it had borrowed from the banks. This arrangement is regarded as beneficial to both the general taxpayer and the car rider.

Milwaukee Seeks to Control Its Own Water-Rates

MILWAUKEE, WIS.—Petition for another hearing to keep Milwaukee's water-rates under control of the city rather than the Wisconsin Railroad Commission has been filed with the State Supreme Court by John M. Niven, City Attorney.

In a suit brought against the city by several large corporations which protested the rates, the higher court ruled that the rate set by the Common Council was illegal because it had not been approved by the Railroad Rate Commission. The firms bringing suit, all of which are large consumers of water, are paying bills under protest. Should they win in final settlement they would be entitled to a refund of more than 50 per cent of the amounts paid the city. Practically all other consumers, whose bills are small, are paying without protest.

According to members of the Commission, no action will be taken unless twenty-five members of some organization representing a group of citizens files a complaint; then a new hearing will be held.

Higher Water-Rates in Washington

WASHINGTON, D. C.—An increase in the District water-rates of 12½ per cent, as provided under an act of Congress, has been approved by the District Commissioners. In brief, the new schedules as arranged by J. S. Garland, Superintendent of the Water Department, are as follows:

Tenements, two stories or less in height, $7.03 per annum in advance. Additional front footage or height, 44 cents per foot.

Meter-rates, $6.36 per annum in advance as compared to the present rate of $5.65. A charge of 6 cents per hundred cubic feet is made for all water used in excess of 7,500 gallons.

Wage Increase for Municipal Railway Employees

SAN FRANCISCO, CALIF.—The Board of Public Works, in which body rests the power to fix the compensation of the Municipal Railway employees, at the request of Mayor James Rolph, Jr., recently awarded platform men a wage increase of 40 cents a day. This increase raised the hourly rate from 67½ cents to 72½ cents, or to $5.80 per day. It did not, however, affect the salary of employees of the system, other than the platform men. The increase is to be paid out of the present income of the road and does not necessitate an increase in the present 5-cent fare. The Mayor was advised by the railway officials that there was a surplus of $90,000 in the operating fund of the road that might be applied immediately toward the raise, and that the income of the line would be sufficient to meet the increased overhead. The original request from the men, filed during December, 1924, was for an additional $1 a day. This was later reduced to 60 cents per day. The 40-cent increase was suggested by the Board of Supervisors.

Budd-Michelin Dual Wheels put the heavy truck in step with modern transportation

◆

WHEN Budd-Michelin Dual Wheels showed the bus industry the economies and advantages of riding on air they started a new era in motor transportation.

Truck owners reasoned that if 40,000 giant buses could travel on pneumatics and get 15,000 to 20,000 miles from a set of tires, so could heavy trucks.

Today, thousands of truck owners are putting their trucks of two tons and up on Budd-Michelin Duals. Warehousemen, fleet owners, contractors, bakers, oil men, and many others are swinging to them. Municipalities are saving money and setting a good example by putting them on fire trucks and city motor equipment.

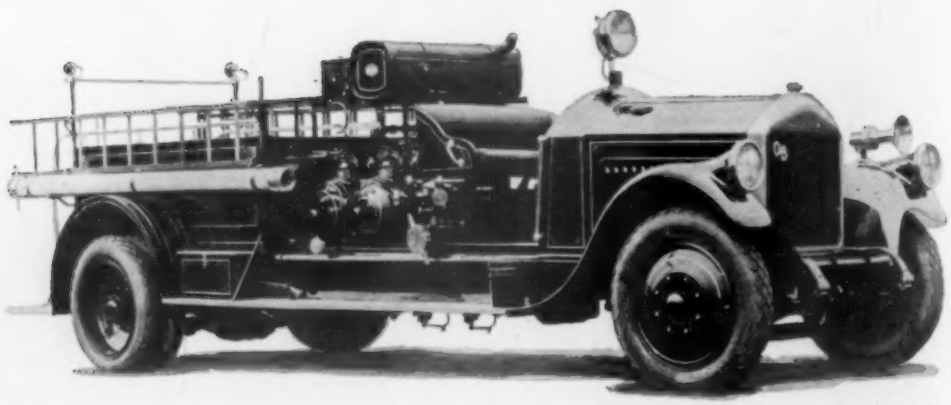
In every industry where heavy trucks are used, Budd-Michelin Duals mean greater speed with safety to the truck and the load. They mean less wear and tear on the truck, fewer repairs, lower upkeep and longer life.

They have made the heavy truck adaptable to wider fields of transportation and made it a more economical means of conveyance. All truck manufacturers supply Duals on new jobs and your present trucks can be equipped with them. Ask your dealer—or write us.

BUDD

WHEEL COMPANY

Detroit



The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Minimum Rates and Service Charges for Water-Meters—Part II

Prepared from Signed Reports from Water-Works Officials

(Continued from June issue)

INDIANA

Anderson

Monthly Meter Rates

First	7,500 gals.	16¢ per 1,000 gals.
Next	15,000 "	14¢ " " "
"	22,500 "	12¢ " " "
"	45,000 "	11¢ " " "
"	90,000 "	9¢ " " "
"	500,000 "	8¢ " " "
"	1,000,000 "	7¢ " " "
"	2,000,000 "	6¢ " " "

Monthly Minimum Charges

½- or ¾-inch meter	$1.00
¾-inch "	1.00
1-inch "	1.50
1½-inch "	2.50
2-inch "	3.50
3-inch "	5.50
3-inch "	7.00
6-inch "	10.00

Brazil

Meter Rates

First	1,000 cu. ft.	30¢ per 100 cu. ft.
Next	2,000 " "	26¢ " " " "
"	2,000 " "	20¢ " " " "
"	5,000 " "	14¢ " " " "
Over	10,000 " "	9¢ " " " "

Monthly Minimum Charges

¾-inch meter	$0.75
¾-inch "	1.00
1-inch "	1.50
1½-inch "	2.50
2-inch "	4.00
3-inch "	6.00
4-inch "	8.00
6-inch "	12.00

Converse

Quarterly Meter Rates

First	6,000 gals.	25¢ per 1,000 gals.
Next	9,000 "	20¢ " " "
"	30,000 "	15¢ " " "
"	30,000 "	11¢ " " "
Over	75,000 "	8¢ " " "

Quarterly Minimum Charges

¾-inch meter	$2.25
¾-inch "	3.00
1-inch "	5.00
1½-inch "	6.00
2-inch "	9.00
3-inch "	15.00
4-inch "	21.00
6-inch "	30.00

East Chicago

Monthly Meter Rates

First	10,000 gals.	31½¢ per 1,000 gals.
Next	15,000 "	25¢ " " "
"	25,000 "	20¢ " " "
"	250,000 "	15¢ " " "
"	700,000 "	10¢ " " "
"	2,000,000 "	8¢ " " "
Over	3,000,000 "	6½¢ " " "

If bills are paid within 10 days beginning with the day following the day bill is properly rendered, a discount of 10 per cent will be allowed.

Monthly Minimum Charges

¾-inch meter	$1.25
¾-inch "	2.00
1-inch "	3.50
1½-inch "	5.00
2-inch "	8.00
3-inch "	15.00
4-inch "	24.00
6 inch "	40.00

Indianapolis

Monthly Meter Rates

First	700 cu. ft.	21½¢ per 100 cu. ft.
Next	11,300 " "	14¢ " " " "
"	18,000 " "	12¢ " " " "
"	20,000 " "	10¢ " " " "
"	50,000 " "	8¢ " " " "
"	100,000 " "	6¢ " " " "

Monthly Minimum Charges

¾-inch meter	$1.50
¾-inch "	3.00
1-inch "	4.50
1½-inch "	7.00
2-inch "	11.00
3-inch "	20.00
4-inch "	30.00
6-inch "	50.00

Ladoga

Meter Rates

First	50,000 gals.	40¢ per 1,000 gals.
Next	150,000 "	35¢ " " "
Over	200,000 "	30¢ " " "

Quarterly Minimum Charges

¾-inch meter	$2.00
1-inch "	3.00
2-inch "	6.00
3-inch "	8.00

La Porte

Monthly Meter Rates

First	30,000 gals.	10¢ per 1,000 gals.
Next	60,000 "	8¢ " " "
"	120,000 "	6¢ " " "
Over	210,000 "	4¢ " " "

Monthly Minimum Charges

½-inch meter	$0.50
⅝-inch "	.65
¾-inch "	.75
1-inch "	1.00
1¼-inch "	1.25
1½-inch "	1.50
2-inch "	2.00
3-inch "	5.00
4-inch "	8.00
6-inch "	10.00
8-inch "	12.00

Linton

Monthly Meter Rates

First	15,000 gals	35¢ per 1,000 gals.
Next	15,000 "	30¢ " " "
"	30,000 "	25¢ " " "
"	60,000 "	20¢ " " "
"	60,000 "	15¢ " " "
"	120,000 "	12¢ " " "
Over	300,000 "	10¢ " " "

Monthly Minimum Charges

½-, ¾- or 1-inch meter	$1.00
1½-inch "	1.50
2-inch "	2.00

Monticello

Quarterly Meter Rates

First	7,500 gals.	20¢ per 1,000 gals.
Next	7,500 "	18¢ " " "
"	10,000 "	16¢ " " "
"	15,000 "	14¢ " " "
"	25,000 "	12¢ " " "
"	35,000 "	10¢ " " "
"	50,000 "	8¢ " " "
"	350,000 "	7½¢ " " "
"	1,500,000 "	7¢ " " "
Over	2,000,000 "	6¾¢ " " "

Quarterly Minimum Charges

½-inch meter	$1.50
¾-inch "	2.00
1-inch "	3.00
1¼-inch "	4.00
1½-inch "	5.00
2-inch "	7.00
3-inch "	10.00
4-inch "	15.00
6-inch "	20.00

Mt. Vernon

Monthly Meter Rates

First	50,000 gals.	40¢ per 1,000 gals.
Next	75,000 "	30¢ " " "
"	100,000 "	20¢ " " "
"	125,000 "	14¢ " " "
"	175,000 "	10¢ " " "
Over	525,000 "	6¢ " " "

12 years haven't worn it!

The Trinidad Native-Lake Asphalt laid on Ash Street—from Grand Avenue to Fourth Street—Waukegan, Illinois, in 1914, is not only reported in "very good" condition, but *there has been no maintenance to date.*

Waukegan has found out what cities all over the world in every clime have learned—that pavements of nature-made Trinidad are not only attractive, resilient, noiseless, easy to keep clean, but that they are long-lasting and cost less to maintain than artificially-produced paving material.

Another of our products—Bermudez Road Asphalt—has demonstrated its merits for road building through years of service. Interesting data on request.

The Barber Asphalt Company
Philadelphia

New York, Chicago, Pittsburgh, St. Louis, Kansas City, San Francisco

TRINIDAD LAKE ASPHALT

MONTHLY SERVICE CHARGES

½- to ⅝-inch meter	$0.50
¾-inch "	1.00
1-inch "	1.75
1½-inch "	3.00
2-inch "	5.00
3-inch "	7.50
4-inch "	10.00
6-inch "	12.00

New Albany

METER RATES

First	7,500 gals.	22¢ per 1,000 gals.
Next	15,000 "	20¢ " " "
"	22,500 "	18¢ " " "
"	45,000 "	16¢ " " "
"	410,000 "	11¢ " " "
"	500,000 "	10¢ " " "
"	1,000,000 "	8¢ " " "
Over	2,000,000 "	7¢ " " "

MONTHLY MINIMUM CHARGES

½- or ⅝-inch meter	$1.50
¾-inch "	2.00
1-inch "	3.00
1½-inch "	5.00
2-inch "	7.50
3-inch "	10.00
4-inch "	20.00
6-inch "	40.00

Princeton

MONTHLY METER RATES

First	25,000 gals.	33¢ per 1,000 gals.
Next	25,000 "	29¢ " " "
"	100,000 "	25¢ " " "
"	350,000 "	21¢ " " "
"	500,000 "	17¢ " " "
"	500,000 "	15¢ " " "
Over	1,500,000 "	13¢ " " "

MONTHLY MINIMUM CHARGES

½-, ⅝- or ¾-inch meter	$1.00
1-inch "	1.50
1½-inch "	2.75
2-inch "	3.75
3-inch "	7.50
4-inch "	15.00
6-inch "	30.00

Redkey

MONTHLY METER RATES

First	20,000 gals.	25¢ per 1,000 gals.
Next	50,000 "	20¢ " " "
"	100,000 "	15¢ " " "
"	200,000 "	12½¢ " " "
Over	300,000 "	10¢ " " "

MONTHLY MINIMUM CHARGES

¾-inch meter	$0.50
1-inch "	1.00
2-inch "	3.00
3-inch "	5.00
4-inch "	7.00

Rockport

METER RATES

First	10,000 gals.	35¢ per 1,000 gals.
Next	10,000 "	30¢ " " "
"	10,000 "	25¢ " " "
"	10,000 "	20¢ " " "
"	10,000 "	15¢ " " "
Over	50,000 "	12½¢ " " "

MINIMUM CHARGES

½-inch meter	$1.50
⅝-inch "	2.00
¾-inch "	2.50
1-inch "	3.50
1¼-inch "	4.50
1½-inch "	5.50
2-inch "	7.50

Richmond

MONTHLY METER RATES

First	1,500 cu. ft.	20¢ per 100 cu. ft.
Next	6,000 " "	15¢ " " " "
"	37,500 " "	10¢ " " " "
"	105,000 " "	8¢ " " " "
"	300,000 " "	7¢ " " " "
Over	450,000 " "	6½¢ " " " "

MONTHLY MINIMUM CHARGES

½- or ⅝-inch meter	$1.00
¾-inch "	1.50
1-inch "	2.00
1½-inch "	3.00
2-inch "	5.00
3-inch "	10.00
4-inch "	15.00
6-inch "	25.00

Seymour

MONTHLY METER RATES

First	4,000 gals.	30¢ per 1,000 gals.
Next	16,000 "	25¢ " " "
"	80,000 "	15¢ " " "
"	100,000 "	12¢ " " "
"	300,000 "	9¢ " " "
Over	500,000 "	8¢ " " "

MONTHLY MINIMUM CHARGES

½- or ⅝-inch meter	$1.00
¾-inch "	2.00
1-inch "	2.50
1½-inch "	3.00
2-inch "	4.00
3-inch "	6.00

Shelbyville

MONTHLY METER RATES

		Gross	Net
First	5,000 gals.	27¢ per 1,000 gals.	25¢
Next	5,000 "	22¢ " " "	20¢
"	10,000 "	16¢ " " "	15¢
"	30,000 "	14¢ " " "	13¢
"	50,000 "	13¢ " " "	12¢
"	150,000 "	12¢ " " "	11¢
"	250,000 "	11¢ " " "	10¢
"	500,000 "	10¢ " " "	9¢
Over	1,000,000 "	9¢ " " "	8¢

MONTHLY MINIMUM CHARGES

1-inch meter	$0.80
1½-inch "	1.75
2-inch "	2.75
3-inch "	5.50
4-inch "	11.00
6-inch "	16.00

South Bend

MONTHLY METER RATES

First	10,000 cu. ft.	15¢ per 100 cu. ft.
Next	20,000 " "	12¢ " " " "
"	70,000 " "	9¢ " " " "
Over	100,000 " "	5¢ " " " "

MONTHLY MINIMUM CHARGES

⅝ inch meter	$0.75
¾-inch "	1.25
1-inch "	2.50
1¼-inch "	3.00
1½-inch "	5.00
2-inch "	10.00
3-inch "	15.00
4-inch "	25.00
6-inch "	40.00

Wabash

QUARTERLY METER RATES

First	3,000 cu. ft.	$2.50 per 1,000 cu. ft.
Next	3,000 " "	1.50 " " " "
"	6,000 " "	1.00 " " " "
"	12,000 " "	.75 " " " "
Over	24,000 " "	.50 " " " "

QUARTERLY MINIMUM RATES

⅝-inch meter	$3.00
¾-inch "	3.75
1-inch "	5.00
1½-inch "	7.50
2-inch "	10.00
4-inch "	12.50
6-inch "	25.00

KANSAS

Cawker City

QUARTERLY METER RATES

First	10,000 gals.	36¢ per 1,000 gals.
Next	10,000 "	20¢ " " "
Over	20,000 "	15¢ " " "

Meter rent 15 cents per month. 16⅔ per cent discount if paid by the tenth of the month.

Fort Scott

METER RATES

First	800 cu. ft.	27½¢ per 100 cu. ft.
Next	4,200 " "	21¢ " " " "
"	10,000 " "	16¢ " " " "
"	15,000 " "	11¢ " " " "
"	20,000 " "	9¢ " " " "
"	50,000 " "	8¢ " " " "
"	100,000 " "	7½¢ " " " "
"	400,000 " "	7¢ " " " "
Over	600,000 " "	6½¢ " " " "

All services using over 3,000 cubic feet per quarter may, at the option of the water department, be collected monthly, and the monthly minimum charge for such services shall be as follows:

⅝- or ¾-inch meter	$2.20
1-inch "	3.00
2-inch "	5.00

Supreme for Road Work

Cletrac
Crawler Tractors

WHETHER for breaking out new highways under hardest possible conditions—or for the heavy, steady jobs of road maintenance—Model "K" Cletrac never fails to effect remarkable savings and deliver unfaltering service. Here is a road-building tractor of amazing power, outstanding economy and remarkable ease of handling.

The short turning radius of Model "K" Cletrac (within its own length)—its low-hung weight—positive traction over any footing—and wealth of power make it the ideal power unit for all road jobs.

"Snap" Lubrication

Cletrac K is the only tractor made with "Snap" lubrication At the push of a plunger—without stopping the machine—the lower track wheels are thoroughly oiled.

For low cost operation—downright satisfaction—and a tractor of lasting quality you want Model "K" Cletrac. Write today for descriptive literature, prices and full information.

The Cleveland Tractor Company
Cleveland, Ohio

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Hutchinson

MONTHLY METER RATES

First	5,000 gals.	30¢ per 1,000 gals.
Next	5,000 "	27½¢ " " "
"	5,000 "	25¢ " " "
"	15,000 "	20¢ " " "
"	30,000 "	18¢ " " "
"	30,000 "	16¢ " " "
"	30,000 "	14¢ " " "
"	30,000 "	12¢ " " "
"	50,000 "	10¢ " " "
"	200,000 "	9¢ " " "
"	200,000 "	8¢ " " "
"	200,000 "	7¢ " " "
"	200,000 "	6¢ " " "
Over	1,000,000 "	5¢ " " "

MONTHLY MINIMUM CHARGES

⅝-inch meter	$1.25
¾-inch "	2.00
1-inch "	3.00
1½-inch "	6.00
2-inch "	12.00

Lyons

MONTHLY METER RATES

First	3,000 gals.	25¢ per 1,000 gals.
Next	10,000 "	20¢ " " "
Over	13,000 "	10¢ " " "
"	25,000 " daily	8¢ " " "

The minimum meter charge per month shall be 75 cents plus the fee for meter rental when the city owns the meter, which fee shall be as follows per year:

⅝-inch meter	$1.00
¾-inch "	1.50
1-inch "	2.00
1½-inch "	3.50
2-inch "	5.00

MONTHLY MINIMUM CHARGES

1-inch meter	$1.00
1½-inch "	10.00
2-inch "	10.00

Manhattan

METER RATES

First	10,000 cu. ft.	$2.00 per 1,000 cu. ft.
Next	10,000 " "	1.75 " " " "
"	20,000 " "	1.50 " " " "
"	20,000 " "	1.30 " " " "
"	20,000 " "	1.10 " " " "
"	20,000 " "	.90 " " " "
Over	100,000 " "	.70 " " " "

QUARTERLY METER RENTALS

½-inch meter	$0.25
¾-inch "	.40
1-inch "	.50
1¼-inch "	.75
2-inch "	1.00

The minimum charge shall be $2.00 per quarter plus the meter rental for 1,000 cubic feet.

KENTUCKY

Catlettsburg, Ky., and Kenova and Ceredo, W. Va.

MONTHLY METER RATES

First	10,000 gals.	45¢ per 1,000 gals.
Next	40,000 "	40¢ " " "
"	50,000 "	35¢ " " "
"	50,000 "	30¢ " " "
"	100,000 "	25¢ " " "
"	250,000 "	17½¢ " " "
Over	500,000 "	10¢ " " "

MONTHLY SERVICE CHARGES
(Allowing 2,000 gallons)

½- or ⅝-inch meter	$0.75
¾-inch "	1.50
1-inch "	2.50
1½-inch "	7.50
2-inch "	10.00
3-inch "	25.00
4-inch "	40.00
6-inch "	75.00

Lexington

MONTHLY METER RATES

First	25,000 gals.	25¢ per 1,000 gals.
Next	25,000 "	22¢ " " "
"	50,000 "	19¢ " " "
"	200,000 "	16¢ " " "
"	200,000 "	13¢ " " "
Over	500,000 "	10¢ " " "

MONTHLY MINIMUM CHARGES

⅝-inch meter	$0.50
¾-inch "	1.00
1-inch "	3.00
1½-inch "	4.50
2-inch "	5.00

LOUISIANA

New Orleans

There shall be the following quarterly service charges, based on the size of the meters, which shall be paid as long as the premises are occupied, regardless of the amount of water consumed:

⅝-inch meter	$0.75
¾-inch "	.90
1-inch "	1.20
1½-inch "	1.80
2-inch "	3.00
3-inch "	4.50
4-inch "	6.00
6-inch "	10.50
8-inch "	18.00
10-inch "	27.00
12-inch "	36.00

All water consumers whose premises are connected with the sewers and who use the public water-supply for flushing water-closets, or who reside in areas where sewers are not yet available and who use the public water-supply for flushing water-closets, will be allowed free for sewerage purposes one-fourth of their total consumption; provided, however, that this free allowance shall not exceed:

600 gals. per quarter for each permanent inmate.
300 " " " " " employee on the premises not less than 8 hours per day.
200 " " " " " pupil in schools, colleges, etc.

The free water allowed for sewerage purposes shall be deducted from the total consumption as shown by the meter and the remainder shall be pay water, the charge per month for which shall be as follows:

First 100,000 gals.	10¢ per 1,000 gals.
Over 100,000 "	7¢ " " "

MAINE

Augusta

DOMESTIC METER RATES
20¢ per 100 cu. ft.

QUARTERLY COMMERCIAL METER RATES

First	6,000 cu. ft.	15¢ per 100 cu. ft.
Next	9,000 " "	12¢ " " " "
"	15,000 " "	10¢ " " " "
Over	30,000 " "	8¢ " " " "

For ⅝- or ¾-inch meters the annual minimum charge shall be $18 for the first customer or tenant, and $12 for each additional customer or tenant on the same meter, except where there is only one fixture in use, in which event the yearly minimum charge shall be $6.

QUARTERLY MINIMUM CHARGES

1-inch meter	$5.00
1½-inch "	9.00
2-inch "	12.50
3-inch "	18.00
4-inch "	25.00
6-inch "	50.00
8-inch "	100.00
10-inch "	150.00

Rockland

MONTHLY METER RATES

First	2,000 cu. ft.	30¢ per 100 cu. ft.
Next	8,000 " "	20¢ " " " "
Over	10,000 " "	10¢ " " " "

QUARTERLY MINIMUM CHARGES

⅝-inch meter	$4.00
¾-inch "	5.00
1-inch "	15.00
1½-inch "	25.00
2-inch "	50.00

Waterville

QUARTERLY METER RATES

First	10,000 cu. ft.	20¢ per 100 cu. ft.
Next	90,000 " "	10¢ " " " "
Over	100,000 " "	5¢ " " " "

QUARTERLY MINIMUM CHARGES

⅝-inch meter	$3.00
¾-inch "	4.50
1-inch "	7.50
1½-inch "	15.00
2-inch "	25.00
3-inch "	50.00
4-inch "	75.00
6-inch "	100.00
8-inch "	125.00
10-inch "	150.00

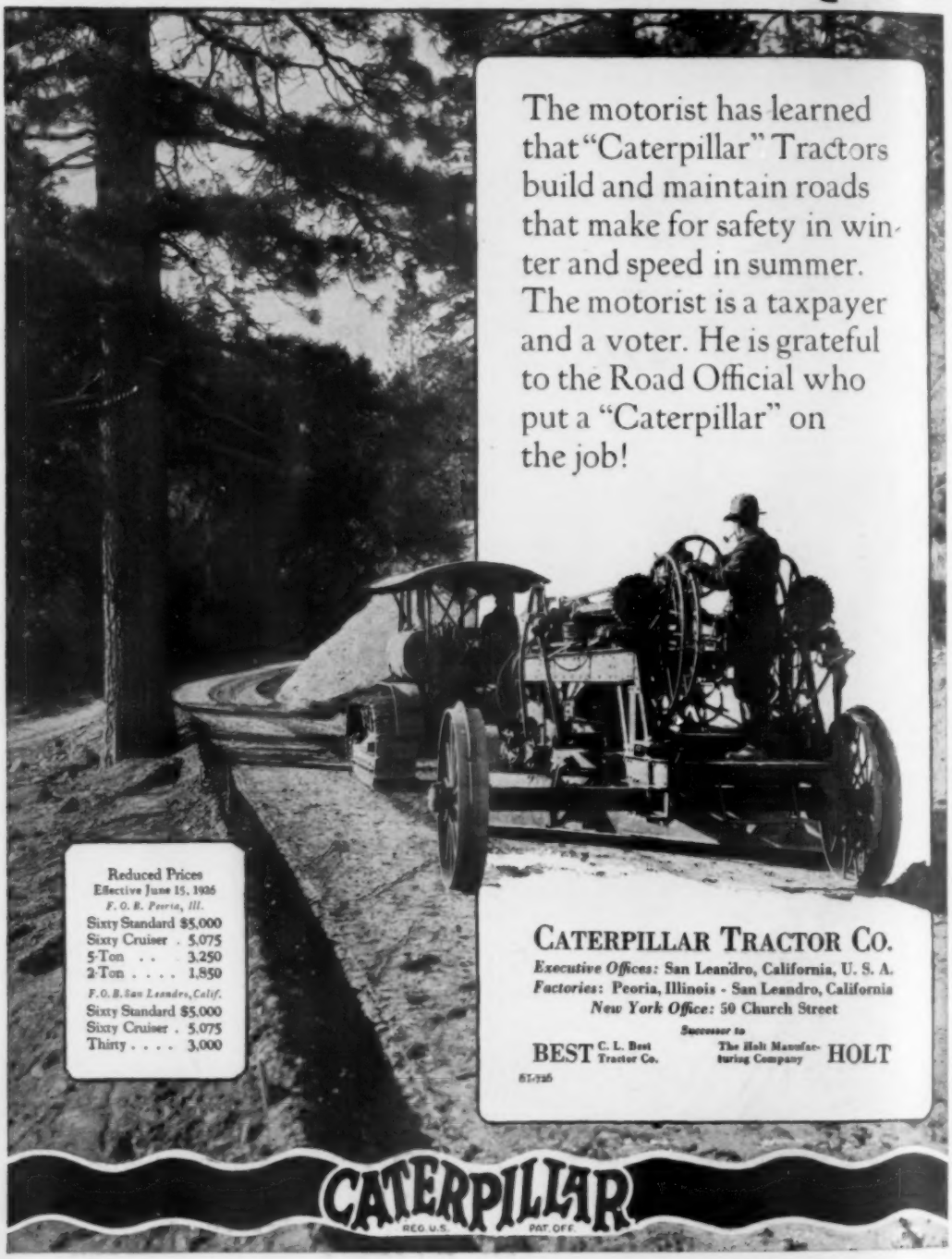
Winthrop

DOMESTIC METER RATES
25¢ per 100 cu. ft.

QUARTERLY COMMERCIAL METER RATES

First	6,000 cu. ft.	20¢ per 100 cu. ft.
Next	6,000 " "	15¢ " " " "
"	15,000 " "	10¢ " " " "
Over	27,000 " "	8¢ " " " "

SAFETY FIRST~Then Speed



The motorist has learned that "Caterpillar" Tractors build and maintain roads that make for safety in winter and speed in summer. The motorist is a taxpayer and a voter. He is grateful to the Road Official who put a "Caterpillar" on the job!

Reduced Prices
Effective June 15, 1926
F. O. B. Peoria, Ill.

Sixty Standard	$5,000
Sixty Cruiser	5,075
5-Ton	3,250
2-Ton	1,850

F. O. B. San Leandro, Calif.

Sixty Standard	$5,000
Sixty Cruiser	5,075
Thirty	3,000

CATERPILLAR TRACTOR CO.
Executive Offices: San Leandro, California, U. S. A.
Factories: Peoria, Illinois - San Leandro, California
New York Office: 50 Church Street

Successor to
BEST C. L. Best Tractor Co. — The Holt Manufacturing Company HOLT

81-725

CATERPILLAR
REG. U.S. PAT. OFF.

Quarterly Minimum Charges

⅝- or ¾-inch meter	$3.00
1-inch "	4.50
1½-inch "	9.00
2-inch "	12.50
3-inch "	18.00
4-inch "	25.00
6-inch "	50.00

Yarmouth

Quarterly Meter Rates

First	600 cu. ft.	$2.00 per quarter
Next	9,400 " "	20¢ per 100 cu. ft.
"	5,000 " "	18¢ " " " "
Over	15,000 " "	16¢ " " " "

Quarterly Meter Rentals

⅝-inch meter	$0.25
¾-inch "	.50
1-inch "	1.00

MARYLAND

Baltimore

Quarterly Meter Rates

First	5,000 cu. ft.	$2.00 per 1,000 cu. ft.
Next	45,000 " "	1.00 " " " "
Over	50,000 " "	.75 " " " "

Quarterly Minimum Charges

⅝-inch meter	$ 2.00	for 1,000 cu. ft.
¾-inch "	3.50	1,750 " "
1-inch "	6.00	3,000 " "
1½-inch "	10.00	5,000 " "
2-inch "	15.00	10,000 " "
3-inch "	30.00	25,000 " "
4-inch "	50.00	45,000 " "
6-inch "	90.00	96,667 " "
8-inch "	160.00	190,000 " "
10-inch "	225.00	276,667 " "
12-inch "	275.00	343,333 " "

Frederick

Semi-Annual Meter Rates

First	25,000 gals.	25¢ per 1,000 gals.
Next	25,000 "	20¢ " " "
"	100,000 "	15¢ " " "
"	150,000 "	12½¢ " " "
"	200,000 "	10¢ " " "
"	250,000 "	7¢ " " "
"	250,000 "	5¢ " " "
"	1,000,000 "	4¢ " " "
"	1,000,000 "	3½¢ " " "
Over	3,000,000 "	3¢ " " "

Semi-Annual Minimum Charges

1-inch meters or smaller	$5.00
1- to 3-inch meters	7.50
3-inch meters or larger	10.00

MASSACHUSETTS

Athol

The domestic rate shall be 30 cents per 100 cubic feet for all water used in excess of 800 cubic feet per quarter, for which a minimum charge of $3.00 will be made.

Monthly Manufacturing Rates

First	10,000 cu. ft.	18¢ per 100 cu. ft.
Over	10,000 " "	10¢ " " " "

Annual Minimum Charges

1-inch services	$20.00
2-inch "	26.00
3-inch "	40.00
4-inch "	80.00
6-inch "	160.00

Greenfield

Quarterly Meter Rates

First	10,000 cu. ft.	12¢ per 100 cu. ft.
Next	90,000 " "	9¢ " " " "
Over	100,000 " "	6¢ " " " "

Quarterly Service Charges

⅝-inch meter	$1.00
¾-inch "	1.50
1-inch "	2.50
1¼-inch "	3.00
1½-inch "	4.50
2-inch "	7.00
3-inch "	12.00
4-inch "	18.00
6-inch "	35.00

Hudson

Semi-Annual Meter Rates

First	5,000 cu. ft.	25¢ per 100 cu. ft.
Next	5,000 " "	15¢ " " " "
Over	10,000 " "	10¢ " " " "

Semi-Annual Minimum Charges

⅝-inch meter	$3.00
¾-inch "	5.00
1-inch "	6.00
1¼-inch "	8.00
1½-inch "	9.00
2-inch "	12.50
3-inch "	17.50
4-inch "	30.00
6-inch "	50.00
8-inch "	75.00
10-inch "	112.50

Mansfield

Annual Meter Rates

First	100,000 gals.	33½¢ per 1,000 gals.
Next	150,000 "	25¢ " " "
"	250,000 "	20¢ " " "
"	500,000 "	15¢ " " "
"	500,000 "	12¢ " " "
Over	1,500,000 "	Special rates.

Annual Minimum Charges

1-inch meter	$10.00	for 30,000 gals.
1¼-inch "	12.50	37,500 "
1½-inch "	15.00	45,000 "
2-inch "	20.00	60,000 "
3-inch "	30.00	90,000 "
4-inch "	40.00	120,000 "

Northampton

Quarterly Meter Rates

First	10,000 cu. ft.	12¢ per 100 cu. ft.
Next	90,000 " "	8¢ " " " "
Over	100,000 " "	4½¢ " " " "

Quarterly Service Charges

⅝-inch meter	$1.00
¾-inch "	1.25
1-inch "	1.75
1½-inch "	3.00
2-inch "	5.00
3-inch "	10.00
4-inch "	15.00
6-inch "	30.00
8-inch "	50.00

MICHIGAN

Cadillac

Monthly Meter Rates

First	10,000 cu. ft.	12¢ per 100 cu. ft.
Over	10,000 " "	8¢ " " " "

Monthly Service Charges

⅝-inch meter	$0.65
¾-inch "	.85
1-inch "	1.00
1½-inch "	1.25
2-inch "	2.00
3-inch "	4.00
4-inch "	6.00
6-inch "	10.00

Discount of 10 per cent for prompt payment.

Coldwater

Monthly Meter Rates

First	10,000 gals.	10¢ per 1,000 gals.
Next	10,000 "	8¢ " " "
Over	20,000 "	6¢ " " "

Monthly Minimum Charges

⅝- or ¾-inch meter	$0.75
1-inch "	1.00
1¼- or 1½-inch "	1.50
2-inch "	2.00
Over 2-inch "	Special

Detroit

Quarterly Meter Rates

First	10,000 cu. ft.	65¢ per 1,000 cu. ft.
Next	90,000 "	50¢ " " " "
Over	100,000 " "	40¢ " " " "

Minimum charge $1.25 per quarter.

Annual Service Charges

⅝-inch meter	$2.40
¾-inch "	3.60
1-inch "	7.20
1½-inch "	14.40
2-inch "	24.00
3-inch "	33.60
4-inch "	43.20
6-inch "	72.00
8-inch "	110.40
10-inch "	158.40
12-inch "	187.20
16-inch "	302.40
24-inch "	532.80

Holland

Quarterly Meter Rates

First	50,000 cu. ft.	11¢ per 100 cu. ft.
Next	50,000 "	10¢ " " " "
"	50,000 " "	9¢ " " " "
Over	150,000 " "	7¢ " " " "

Quarterly Minimum Charges

⅝-inch meter	$1.50
¾-inch "	2.00
1-inch "	3.50
1½-inch "	5.00
2-inch "	8.50
3-inch "	17.50
4-inch "	25.00
6-inch "	35.00

"Armorplated" concrete paving built by

The Vibrolithic METHOD

Write for Booklet A-7

American Vibrolithic Corporation

INSURANCE EXCHANGE BUILDING DES MOINES, IOWA

SALES OFFICES IN 23 OTHER CITIES

Lansing

MONTHLY METER RATES

First 2,000 cu. ft.	12¢ per 100 cu. ft.
Next 3,000 " "	11¢ " " " "
" 5,000 " "	9½¢ " " " "
" 25,000 " "	8¢ " " " "
" 465,000 " "	6¾¢ " " " "
Over 500,000 " "	6¢ " " " "

MONTHLY MINIMUM CHARGES

⅝-inch meter	$0.65
¾-inch "	.85
1-inch "	1.25
1½-inch "	2.00
2-inch "	2.50
3-inch "	5.00
4-inch "	10.00
6-inch "	18.00
8-inch "	30.00

A discount of 20 per cent will be allowed on all bills paid on or before the 15th of the month in which the bills are presented.

Marquette

QUARTERLY METER RATES

First 7,000 cu. ft.	10¢ per 100 cu. ft.
Next 7,000 " "	7¢ " " " "
" 7,000 " "	5¢ " " " "
Over 21,000 " "	3¢ " " " "

QUARTERLY SERVICE CHARGES

⅝-inch meter	$1.35
¾-inch "	1.80
1-inch "	3.00
1¼-inch "	3.75
1½-inch "	4.50
2-inch "	6.00
3-inch "	12.00
4-inch "	24.00
6-inch "	36.00
8-inch "	60.00

Monroe

DAILY METER RATES

First 500 gals.	45¢ per 1,000 gals.
Next 500 "	37½¢ " " "
" 1,000 "	30¢ " " "
" 2,000 "	22½¢ " " "
" 2,000 "	18¢ " " "
" 2,000 "	15¢ " " "
" 2,000 "	12¢ " " "
Over 10,000 "	9¢ " " "

QUARTERLY MINIMUM CHARGES

⅝-inch service	$2.00
¾-inch "	3.00
1-inch "	5.00
1¼-inch "	7.50
1½-inch "	8.75
2-inch "	12.50
3-inch "	25.00
4-inch "	37.50
6-inch "	62.50

Niles

METER RATES

First 700 cu. ft.	$1.67
Next 6,000 " "	12¢ per 100 cu. ft.
" 5,000 " "	8¢ " " " "
" 8,300 " "	6¢ " " " "
Over 10,000 " "	4½¢ " " " "

ANNUAL METER RENTAL

⅝-inch meter	$2.00
¾-inch "	3.00
1-inch "	5.00

Discount of 10 per cent on water used when paid within discount period. Water-meter charge net.

Owosso

QUARTERLY METER RATES

First 900 cu. ft.	Minimum charge below.
Next 12,000 " "	13¢ per 100 cu. ft.
Over 12,000 " "	8¢ " " " "

QUARTERLY MINIMUM CHARGES

⅝-inch meter	$3.50
¾-inch "	5.25
1-inch "	7.00
1½-inch "	8.50
2-inch "	14.00
3-inch "	21.75
4-inch "	43.75
6-inch "	105.00

Plymouth

QUARTERLY METER RATES

First 25,000 gals.	15¢ per 1,000 gals.
Next 75,000 "	5¢ " " "
Over 100,000 "	2¢ " " "

QUARTERLY SERVICE CHARGE

⅝-inch meter	$1.50
¾-inch "	2.00
1-inch "	2.50
1½-inch "	3.75
2-inch "	7.50
3-inch "	15.00
4-inch "	22.50
6-inch "	45.00

Sault Ste. Marie

QUARTERLY METER RATES

First 10,000 cu. ft.	9¢ per 100 cu. ft.
Next 90,000 " "	7¢ " " " "
" 200,000 " "	5¢ " " " "
Over 300,000 " "	1½¢ " " " "

QUARTERLY SERVICE CHARGE

⅝-inch meter	$6.00
¾-inch "	9.00
1-inch "	12.00
1½-inch "	18.00
2-inch "	30.00
3-inch "	60.00
4-inch "	90.00
6-inch "	180.00

(*To be continued in the August issue*)

Tests of Vibrolithic Concrete by the U. S. Bureau of Public Roads

THE Bureau of Public Roads, cooperating with the American Vibrolithic Company, Des Moines, Iowa, has recently completed 28-day tests on concrete slabs constructed of the same materials in accordance with ordinary methods and the Vibrolithic process patented by the company. The tests were made for the purpose of obtaining data on the relative strength of specimens equivalent in every particular except the method of construction. To that end every effort was made to eliminate all variables except the methods of placing, tamping, and finishing, and to have all operations performed under as nearly similar working conditions as possible.

Although it is recognized that the ultimate problem is one of economy, the current investigations have been confined to the study of certain physical properties of slabs made by the two methods; among them, the tensile strength as determined by bending, density, coefficients of expansion, and uniformity of the product.

The program of the tests includes, in addition to those which have been made at the end of 28 days, others that will be made after one year; and the formulation of definite conclusions must await the completion of the latter tests. There are certain indications, however, which may be noted at this time with the understanding that they may be modified by the data obtained from the remaining tests.

Giving due consideration to all features of the investigation, such as the workability of the concrete and the method of finishing the normal specimens, the following tentative conclusions may be drawn from the bending tests at the age of 28 days:

1. The Vibrolithic process resulted in a more uniform product.

2. For a given cement content, the slabs constructed by the Vibrolithic method exhibited greater strength than the normal concrete.

3. The strength of the slabs constructed by the Vibrolithic process, when tested with tension in the bottom, was practically the same as when tested with tension in the top.

4. The strength of the normal concrete when tested with tension in the bottom was less than when tested with tension in the top.

ACKNOWLEDGMENT.—From an extensive report appearing in *Public Roads*, issued by the U. S. Bureau of Public Roads, Department of Agriculture, Washington, D. C., Volume 7, No. 2.

Morgan P. O'Brien

Resurfacing Old Pavements

Mr. Morgan P. O'Brien, City Engineer of Decatur, Ill., says:

"For some years, public officials in Decatur have realized the waste occasioned by the removal bodily of worn out pavements, and replacement with entirely new structures. As early as 1903, the resurfacing of brick with an asphalt wearing surface was tried on North Water Street. The resurfacing material gave very good service, and the old brick was again resurfaced in 1924. In 1922, an extensive program of surfacing was inaugurated, and has been continued since.

"This method of reclaiming worn out streets meets the approval of the taxpayers, inasmuch as it gives them a new street at a fraction of the expense that would be incurred were the old pavement removed and a new one installed."

Many of the finest streets in Decatur have been resurfaced with

STANOLIND PAVING ASPHALT

Other cities and towns may save money and still have excellent pavements, by following Decatur's example.

The road engineers of the Standard Oil Company (Indiana) will be glad to make a survey of the worn pavements of your community, and recommend the correct grade of asphalt for your needs.

STANDARD OIL COMPANY [INDIANA]
General Offices:* 910 S. Michigan Ave., *Chicago, Ill.

Two Views of Streets in Decatur Resurfaced with Stanolind Paving Asphalt Over Brick

The City's Legal Rights and Duties

Conducted by A. L. H. Street, Attorney at Law

City Not Liable:

City Not Liable for Negligent Operation of a Park

The rule that a city is not liable for injuries resulting from negligent performance of a governmental function was applied by the Connecticut Supreme Court of Errors to a case where a child was injured on a swing in a city park. (Epstein vs. City of New Haven, 132 Atlantic Reporter, 467.)

City Not Liable for Negligence Of Park Employee

An Iowa city is not liable for accidents resulting from negligence of its employees in the operation of a public park, according to a decision of the Supreme Court of that state, handed down in the case of Norman vs. City of Chariton, 207 Northwestern Reporter, 134. Defendant city defeated a damage claim based on death of one struck by a tractor used in grading operations in its park. The opinion cites in support of the conclusion reached decisions of the highest courts of Wisconsin, California, Washington, Kentucky, Georgia, Kansas, and New Jersey.

City Not Liable for Injury to Child Playing on Tractor

That a city's employees may have left a tractor in a street so insecurely stationed that it started running backward when a child climbed upon it does not show that the street was "out of repair" in such sense as to make the city liable for neglect to keep its streets in a state of repair. So held the West Virginia Supreme Court of Appeals in the case of Carder vs. City of Clarksburg, 131 Southeastern Reporter, 349. Finding that operation of the tractor in the construction of streets constituted a governmental function, the Court decided that the city was not liable for resulting injury to the child.

City Not Liable for Negligence of Hospital Employees

The general rule of law that a city is not liable for negligence of its employees engaged in a governmental function was applied by the Massachusetts Supreme Judicial Court to a case where a death was caused by a defective elevator in defendant's city hospital. (Young vs. City of Worcester, 149 Northeastern Reporter, 204.) Quoting an earlier decision, the opinion observes that "it is not thought to be reasonable that a municipality or a public officer, who is engaged upon a public work conducted for the benefit of the people and not for gain, should be held liable for the negligence of its servants or agents."

The opinion adds that the circumstance that negligence in the particular case may have been gross does not alter application of the rule above stated.

City Not Liable for Negligent Operation of Fire-Truck

Following what the appellate courts of other jurisdictions have declared, the Utah Supreme Court holds in the case of Rollow vs. Ogden City, 243 Pacific Reporter, 791, that a city operating a fire department is engaged in such governmental function as renders it immune from liability for injuries caused in negligent operation of a fire-truck on a street. Concerning the effect of an ordinance or statute limiting the speed of motor vehicles, the Court adds:

"It will not be assumed that the regulation was intended to apply to the operation of such fire apparatus unless such intention is couched in express terms or is manifested by necessary or unavoidable implication. Fire-trucks are used for a special purpose only, and are not used or intended to be used upon the streets or highways for either pleasure or business purposes, and hence do not come within the designation of ordinary vehicles. In the more recent Nebraska case, as we have seen, the statute in express terms regulated the speed of fire apparatus and permitted their operation at excessive speed only in cases of emergency."

City Not Liable for Neglect to Maintain Adequate Fire-Fighting Equipment

In the case of Mabe vs. City of Winston-Salem, 130 Southeastern Reporter, 169, decided by the North Carolina Supreme Court, plaintiff was denied the right to recover damages because placing of rocks near a fire hydrant prevented saving her house from destruction by fire. The opinion says, in passing:

"A city, therefore, in the absence of statutory provision to the contrary, does not, by building and operating a system of water-works or by maintaining a fire department, thereby enter into any contract with, or assume any implied liability to, the owners of property to furnish means or water for the extinguishment of fires, and for the breach of which an action in damages may be maintained. A city may not be sued for loss sustained by fire, where the wrongful act charged was neglect in cutting off water from a hydrant, but for which the fire might have been extinguished, or in failing to keep a reservoir in repair, whereby the supply of water became inadequate, or because the pipes were not sufficient or out of order, or because the officers and members of the fire department were negligent in the performance of their duties."

BUSINESS street, residence avenue or country highway, they are all the same from the viewpoint of the *Tax-Payer's Pocketbook.* Only one type of pavement available at reasonable first cost has repeatedly proved its ability to *outlast the bonds issued to pay for it*—VITRIFIED BRICK.

Think this over—name any street or road in your neighborhood *not paved with brick* which has given even 20 years of service. And then recall the fact that here in the United States there are brick pavements in use which were laid 35 to 45 years ago, while Holland is using brick pavements built at Napoleon's order.

Which, to your mind, is the economical policy in paving—to build with "cheap," short-lived materials which will require continuous repair and may not last even 10 years—or to pay an only slightly higher first cost for vitrified brick and get a pavement that will outlast the bonds and may even outlive you?

Vitrified Brick Pavements

OUTLAST THE BONDS

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

Items of Municipal Law

City Has Inherent Power to Suppress Liquor Traffic

The inherent police power of a city is broad enough, without specific grant of authority in its charter or by statute, to enable it to suppress the sale of intoxicating liquor within the municipality's territorial limits. (Louisiana Supreme Court, City of Lafayette vs. Deep, 106 Southern Reporter, 654.)

Disorderly Conduct at Council Meetings

It constituted disorderly conduct, for which prosecution lay under the statutes of New Jersey, to call a member of a city council, at a public session of that body, a "bootlegger," but not to call him a "souphead." (New Jersey Supreme Court, In re Kirk, 130 Atlantic Repoter, 569.)

Unless Fraud or Abuse of Discretion Is Shown, Court Will Not Interfere with Vacation of City Alley

The courts will not interfere with provision by a city council for vacation of an alley unless the action is shown to involve fraud or an abuse of discretion, holds the Michigan Supreme Court in the case of Phelps vs. Stott Realty Company, 207 Northwestern Reporter, 2. Quoting another decision in a similar case, the Court said:

"It is a well-settled rule that a lot owner's right to object to the vacation of a part of a street depends upon whether his lot abuts upon or comes in actual contact with the vacated portion, or access to his lot is entirely or materially cut off by reason of the vacation. That he may be inconvenienced or that he may have to go a more roundabout way to reach certain points does not bring to him any injury different in kind from the general public but only in degree."

City Has no Implied Power to Maintain a Tourist Camp, and Where Such Act Is Ultra Vires, Is Not Liable for Creating a Nuisance

In the case of Kennedy vs. City of Nevada, 281 Southwestern Reporter, 56, the Kansas City, Mo., Court of Appeals decided that defendant was not liable for maintaining a nuisance through unhealthful conditions attending a tourist camp maintained by it, because it had no authority to maintain such a camp. On the principal points involved in the case the Court said:

"The city is liable for creating a nuisance where the authority is exercised in accordance with law, although in an irregular manner. . . . But there is no liability where the act done which is injurious to others is not within the scope of the corporate powers as prescribed by the charter of the city or by positive enactment. . . . Here the city had no authority whatever to acquire land for tourist park purposes; therefore it is not liable for the maintenance of a nuisance in connection therewith. . . .

"However, there is no question but that a city may be liable for maintaining a nuisance on property that it does not own. . . . But, of course, if it has no authority to do the act out of which the nuisance arises, in other words, if the act is wholly ultra vires, then it is not liable for the nuisance. . . .

"Of course, a municipality has no implied power to engage in a private business. . . . The operation of a tourist camp, whether the city receives any compensation therefrom or not, especially where the inhabitants of the city are excluded, is certainly not a public business. The evidence shows that these grounds were used substantially as an outdoor hotel, and no one would contend that a municipality would have implied authority to operate a hotel for the benefit of transients."

The opinion holds that operation of tourists camps does not fall within statutory or charter authority to own and operate public parks.

Validity of Ordinances Establishing Through Traffic Streets

In a habeas corpus proceeding brought by one Wilchar (278 Southwestern Reporter, 850), the Texas Court of Criminal Appeals sustained the validity of an ordinance of the city of El Paso, designating certain streets as right-of-way streets and forbidding driving into them without coming to a full stop. The Court remarked:

"Speaking generally, when certain streets are declared right-of-way streets, this would seem to carry with it a degree of assurance of freedom on such streets possibly of a greater rate of speed, etc. This assurance could not exist in the absence of some corresponding restraint upon those persons entering or crossing such right-of-way streets, else all would fare alike and the ordinance be thus inoperative for the purpose intended. Traffic 'bunches' in every light signal district of any city, and cars—one behind the other—must come to a stop and undergo, if it be a fact, the expense of shifting gears and starting, when allowed by such signals to proceed; but this would not support any claim that a light signal ordinance would be deemed unreasonable. Boulevards and right-of-way streets in many of our cities are situated long distances from the business areas and may not lead thereto, but this does not argue a transgression of the rule of reason in selecting and declaring these to be such privileged thoroughfares."

Jurisdiction of State Commission Over Discontinuance of Railway, But Lack of It as to Paving Obligation

In the cases of City of Hampton vs. Newport News & Hampton Railway, Gas & Electric Company, 131 Southeastern Reporter, 328, 330, the Virginia Supreme Court of Appeals decided that, under the Virginia constitution, the State Corporation Commission could provide for discontinuance of a street railroad on certain streets, where compulsion of continued operation would be confiscatory, despite an existing franchise ordinance. But it was held to be beyond the power of the Commission to determine whether or not the street railway company should be relieved from obligation to pave a street between the rails of its tracks.

We don't roll 'em

The "National" way is the careful, efficient way.

Our manner of loading pipe, as shown in this picture, is significant of the care with which we handle every detail from its very beginning at the cupola to the completed and loaded product.

We manufacture NATIONAL B&S Cast Iron Water and Gas Pipe from 3″ to 30″ diameter in 12-foot lengths and 4″ to 12″ inclusive in 16-foot lengths; also fittings; flanged pipe and fittings. De-Lavaud Centrifugally Cast B&S Cast Iron Pipe in 12-foot lengths, 6″ to 12″ diameter.

Recently we have added to our line, in response to demand, a 2-inch Cast Iron B&S Service Pipe, with Prepared Joint (in 6-foot lengths); also 2″ fittings. This is worthy of your investigation.

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For quick delivery, stocks are carried at Chicago, Kansas City and Dallas. Write or wire nearest office for prices.

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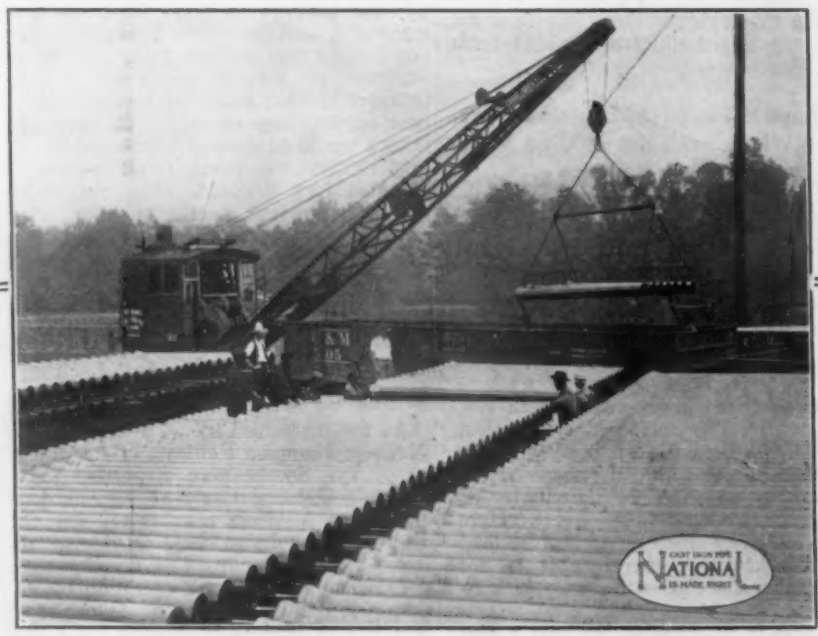

Zoning Notes

Prepared by Frank B. Williams
Author of "The Law of City Planning and Zoning"
From data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Laws and Ordinances

ALABAMA.—Laws, 1923, No. 435.
CHANDLER, ARIZ.—Ordinance, April 23, 1926.
DAVIS, CALIF.—Ordinance, February 15, 1926.
MICHIGAN CITY, IND.—Ordinance, 1926.
TERRE HAUTE, IND.—Ordinance, 1925.
MANHATTAN, KANS.—Ordinance, 1925.
KENTUCKY.—Laws, 1924, Ch. 230, applies to Louisville.
MELROSE, MASS.—Ordinance, 1926.
NEW BEDFORD, MASS.—Ordinance, December 24, 1925.
HOLLAND, MICH.—Ordinance, 1926.
BATAVIA, N. Y.—Ordinance, May 19, 1926.
OLD WESTBURY, N. Y.—Ordinance, May 8, 1926.
JAMESTOWN, N. DAK.—Ordinance, 1926.
DAYTON, OHIO.—Ordinance, May 19, 1926.
CRAFTON, PA.—Ordinance, 1926.
HAVERFORD TOWNSHIP, PA.—Ordinance, 1926.
JOHNSTOWN, PA.—Ordinance, 1926.
NEW CASTLE, PA.—Ordinance, 1925.
SEWICKLEY, PA.—Ordinance, 1925.
MILWAUKEE, WIS.—Height ordinance, April 12, 1926.
SHEBOYGAN, WIS.—Ordinance, 1926.

Recent Zoning Decisions

LOUISIANA.—*Tyler* v. *Harmon*, 104 Southern Reporter 200, rehearing denied, 107 Southern Reporter 704.

Act 118 of 1924 makes it unlawful in municipalities of a given population for any white person to establish his residence on any property located in a negro community without the written consent of a majority of the negroes inhabiting the community, and vice versa; the terms negro and white community being duly defined. The defendant sought to rent an apartment in a white community to a colored man. *Held*, that the statute did not violate the Fourteenth Amendment of the United States Constitution. *Buchanan* v. *Warley*, 245 U. S. Reports 60 distinguished. In that case the sale of the property was forbidden, thus interfering with property rights, while in this case it is social intercourse between the races which is limited as in case of the laws sustained by the Supreme Court of the United States, in *Plessy* v. *Ferguson*, 163 U. S. Reports 537, and other cases forbidding the two races to ride in the same railroad coach.

NEW JERSEY.—*Rohrs* v. *Zabriskie* (*Supreme Court*) 133 Atlantic Reporter 65. Amendment to building code ordinance prohibiting the erection of apartment houses of more than three stories within municipal limits unless fireproof, *held* valid and reasonable exercise of police power of village as adopted in the interest of public safety.

The amendment was subsequent to the application for a building permit, but construction had not begun. *Held*, a mandamus would not issue.

NEW JERSEY.—*State ex rel. Tenez Construction Corporation* v. *Garner, Inspector of Buildings of Town of Bloomfield, et al.*, N. J. Advance Reporter, Vol. IV., No. 23, p. 485. This is one of the many recent cases in which, following the well-known "Nutley Case" (*Ignaciunas* v. *Risby*, 98 N. J. Law Reports 721, affirmed 99 Id. 389), zoning provisions excluding stores and apartments from residential districts are declared unconstitutional in New Jersey. It is noted here because the building was alleged to be against public policy because it would cut off the view of automobilists, thus promoting the occurrence of accidents. The Court found this argument specious, because a residence on this site, not forbidden by the ordinance, would equally obstruct the view. Thus the case may have some bearing on the "view clearance" provisions in recent zoning ordinances.

NEW YORK.—*City of Glens Falls* v. *Standard Oil Co.* (*Supreme Court*), 127 Misc. Reports 104. A zoning ordinance which delegated to the owners of four-fifths of the street frontage in any block the power to determine the structures to be erected or altered in that block, effected an unlawful delegation of governmental power, and is therefore void.

The fact that this valid ordinance existed, and had not been declared invalid by a court of competent jurisdiction, does not prevent the city authorities from further legislating on the subject except after notice and hearing, as provided in the case of amendments by Sec. 83 of the General City Law.

The ordinance, not published twice, as required by the charter, before the beginning of this action, was not rendered effective by being published a second time after this action was begun. It seems that it would have been effective if personal service had been made on defendant before that time.

NEW YORK.—*Fox Lane Corporation* v. *Moore; same* v. *Mann; Court of Appeals*, reported in *New York Law Journal*, June 9, 1926. Decision in the lower Court (summarized in these "Notes" for June, 1926) affirmed.

NEW YORK.—*Case of Mrs. Mary Harness.* Adolph Grant, Esq., Chairman of the Zoning Commission of New Rochelle, writes us with regard to this case as follows:

"You have doubtless heard of the decision of Justice Frank L. Young in this case. It is well that you should know some of the facts so that the decision of Justice Young will not create a wrong impression.

"The Zoning Commission, after thoroughly considering the section of Pelham Road, at the point where Pelham Road connects with New Rochelle, decided that it should be designated 'business' and so signified it upon the plan extending about 800 feet from the Pelham line on both sides of the street into New Rochelle. There are a number of stores that have been there for years—grocery stores, cigar stores, dog kennels, gasoline station, a high manufacturing smoke-stack—so that it would have been

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impracticable to keep this as a residential section.

"When the report of the Commission was brought to the City Council, it called for a public meeting, and some of the landowners (many of whom lived half a mile or more away from this particular section) objected to having business, and the Council was so influenced by the desire of these citizens that they reversed the judgment of the Zoning Commission and designated it a 'residential' section.

"When later Mrs. Mary Harness applied to the Commission for a re-classification of the use of her property from residential to business, the Zoning Commission unanimously acquiesced in Mrs. Mary Harness' petition and so informed the Council. The Council again called a public meeting and, as a result of that meeting, refused again to confirm the Zoning Commission's report and again classified it 'residential,' with the result of Justice Young's decision in favor of the applicant.

"There is a lesson in all this, that where a zoning commission has given conscientious study to the situation, in which the various interests are well considered, the legislative body of a community should be very deliberate in judgment in the interest of the finances of the city and the immeasurable benefit of well-considered zoning before upsetting the decision of a properly constituted zoning commission."

NEW YORK.—*Matter of Wulfsohn* v. *Burden, Inspector of Buildings of Mount Vernon, Supreme Court*, reported, with comments, in the Mount Vernon *Daily Argus*, May 26, 1926. The decision in this well-known case, in the Court of Appeals, sustaining the zoning ordinance of the city, was reported in these "Notes" for January, 1926. This is a subsequent application for peremptory writ of mandamus to compel the city to issue a permit for an apartment house, under the rigorous conditions imposed by the zoning ordinance. Application *denied* on the ground that the applicant had not previously applied to the Board of Appeals. The Justice criticizes the authorities for, apparently, delaying action upon the application until there was time or opportunity to exclude apartments from the lot in question absolutely.

NEW YORK.—*People* v. *Clarke*, 215 N. Y. Supplement 190. The determination of the Board of Appeals, reversing the city building inspectors' refusal to issue permit for erection of apartment house for 92 families covering 37.9 per cent of area of plot, instead of 53 families and 35 per cent, permitted by zoning ordinance, because of practical difficulties and unnecessary hardship, by White Plains Zoning Ordinance, Art. 4, Sec. 19, Subd. 9, *held* not justified by evidence.

The property owners' desire to obtain more money thereby is of itself no evidence of such practical difficulties or unnecessary hardships. The provision of the ordinance, under the general city law prohibiting an apartment house exceeding this limit of number of families and area, is valid. A person attacking the ordinance as confiscatory and unconstitutional has the burden of proof against him in so doing.

WISCONSIN.—*Bartkus* v. *Albers*, Building Inspector of Kenosha, 208 N. W. Reporter 260.

The appellant owns a two-story building in the city. Previous to the adoption of the zoning ordinance he had used the lower floor as a store and the upper floor as a residence. Under the zoning ordinance the district was made residential. Existing non-conforming uses were allowed to continue. The appellant applied for and was refused a permit for a one-story addition to his building connected with the store by a doorway. He stated he intended to use the addition for residential purposes. *Held*, he was entitled to the permit. There is no proof that he intended to use the addition for business. The only evidence is his declaration of intention to use it for residence. If, subsequently, he uses it for business, the courts have the power to prevent such a violation of the zoning ordinance.

Recent Zoning Literature

Dr. J. S. Waterman, head of the Law Department of the University of Arkansas, in response to a demand from citizens of the state for information as to the feasibility of zoning their communities, has prepared a bulletin, issued June, 1926, by the General Extension Service of the University, entitled "Zoning of Towns and Cities in Arkansas."

In a foreword the President of the University summarizes the bulletin as follows:

"The bulletin shows:

"1. That zoning in towns and cities is indispensable for the protection of property and for the orderly and efficient development of cities, both in the residential and in the business and manufacturing districts.

"2. That the Legislature of Arkansas has passed a law authorizing such zoning and that this law has been upheld by the State Supreme Court.

"3. That a zoning ordinance passed by one Arkansas city in accordance with the state law has been upheld by the State Supreme Court."

Edward M. Bassett has written an article, appearing in the *New York Times* of June 6 and other New York papers, entitled "The Building Zone Barometer."

The Massachusetts Federation of Planning Boards has published its Bulletin No. 19, dated May, 1926, on "Zoning—Its Evolution."

The second annual report of the Board of Zoning Appeals of Baltimore for the year ending December 31, 1925, has just appeared. It contains a history of zoning in Baltimore, a statement of the law and practice of zoning in that city at the present time, and a full statement of the situation, showing existing conditions, and the need and effect of zoning there. The report will be of great value to administrators and students, not only in Baltimore but throughout the country.

The Department of Commerce at Washington, D. C., has issued in mimeographed form its bulletin, dated April, 1926, of "Zoning Progress in the United States," consisting of an article by Edward M. Bassett on "Zoning and the Courts," and a "Report on Zoning Laws and Ordinances," bringing the information on this subject up to date.

Accompanying this bulletin is a leaflet to the effect that "More Than Half of the Urban Population of the United States Lives in Zoned Cities."

NEW JERSEY REALTORS SUPPORT ZONING

Emphatic condemnation of "all attempts to take selfish advantage of the present attitude of our courts with respects to zoning" was voiced by the Real Estate Board of Newark, N. J., at its meeting on June 17, in a resolution which further says:

"We commend the Board of Commissioners and the Legal Department of Newark for their decision to resist all selfish attempts to violate our present zoning laws, and hereby pledge ourselves as realtors to aid them by refusing to have any connection, directly or indirectly, with any operation, whether completed, in course of completion, or in prospect, that will or does violate the spirit of zoning and has for its main object the aggrandizement of thoughtless and heedless speculators."

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Modern Crime: Its Prevention and Punishment.—May, 1926, issue of "The Annals" of the American Academy of Political and Social Science. 264 pp. The valuable material in this volume is presented under four divisions: Part I, Modern Tendencies in Crime, edited by J. P. Lichtenberger, Ph.D., Professor of Sociology, University of Pennsylvania; Part II, Judicial Procedure and Modern Crime; Part III, Prevention of Modern Crime; Part IV, Punishment of Modern Crime as a Means of Crime Prevention, edited by Louis N. Robinson, Swarthmore, Pa. Clyde L. King is Editor of "The Annals." Forty-three articles on various phases of these divisions are given, prepared by authorities on the subjects discussed. A comprehensive and most important study of facts and tendencies and possibilities in this field. $2.00. (Apply to the Academy, 39th Street and Woodland Avenue, Philadelphia, Pa.)

The South Tees-Side Regional Planning Scheme.—By Professor Adshead, University of London, and Professor Abercrombie, University of Liverpool. Published by Jordison and Company, Limited, Middlesbrough and London, England. 1925. XIII + 33 quarto pp. Folding maps. Order from Preston Kitchen, Town Clerk, Middlesbrough, England. 7s. 6d.

This report was prepared for the South Tees-Side Joint Town Planning Committee, after several years' study. The River Tees is in northern England, between Durham and Yorkshire, flowing into the North Sea. The district has large industrial areas which are not easily changed and developed. The most striking feature of the plan is the construction of a 16-mile road along the coast, already largely realized. One of the major problems is the providing of more river-crossing facilities. The varied contour of the district offers interesting possibilities; there are the riverside plain, the seaboard and its plain, and the Eston Hills, suggesting respectively industrial development, with residential areas on rising ground, a recreational and more retired residential section, and the rest and refreshment of hill, woodland, and moorland.

Community Music.—Prepared by the Playground and Recreation Association of America. Published by C. C. Birchard and Company, Boston. 1926. 193 pp. $1.50.

This practical and valuable handbook gathers together the evidences and methods of the progress which community music has made during the last few years. It should be used by every one who attempts organization or leadership in this field. The chapters cover the following: The Field of Community Music; Community Singing; Choral and Orchestral Activities; Training Leadership; The Contest Idea in Music; National Music Week; Music and Community Groups; Music in Holiday and Special Day Celebrations; Simple Recreative Music; Organizing for the Community Music Program. In the Appendix are valuable helps: Stories of America's Songs; Singing Games; Stories of Christmas and Easter Carols; a list of old-time songs, under the head, "When Grandma Dreams," to be used as a musical game; and—especially important—four pages of typical questions to be asked in making a study of what your community is doing in community music.

List of the Municipal Corporations, Province of Quebec.—Issued by the Bureau of Statistics of the Province. 83 pp. This pamphlet contains two lists: (1) the 74 county municipalities, in alphabetical order, giving the county-town and the name and postal address of the secretary-treasurer and the warden, respectively; (2) the classification in alphabetical order of local municipalities (cities, towns, villages, parishes, and townships) followed by the name of the municipal county in which they are situated, the name of the secretary-treasurer, with postal address, and the name of the mayor. (Apply to G. E. Marquis, Head of the Bureau of Statistics, Quebec, Que.)

Weights and Measures.—Proceedings of the Eighteenth National Conference on Weights and Measures, of representatives from various states, held at the Bureau of Standards, Washington, D. C., May 25-28, 1926. Miscellaneous Publication No. 70 of the Bureau of Standards. XIII + 187 pp. Illustrated. Addresses, papers, and reports, with discussion on the various phases of securing and enforcing standards in this field. 50 cents. (Apply to the Government Printing Office, Washington, D. C.)

Corrosion—Causes and Prevention: An Engineering Problem.—By Frank M. Speller, D.Sc., Director of Metallurgical Department, National Tube Company. McGraw-Hill Book Company, Inc., New York. 1926. First edition, XII + 621 pp. Photographs, diagrams, and tables. $6.00.

A book in which is presented an inventory of the available information classified according to a practical system. A useful reference book on the subject of corrosion of the ferrous metals. The chapters cover the nature and mechanism of corrosion and its theories; influence of methods of manufacture and treatment; influence of factors internal to the metal and factors external to the metal; corrosion testing; relative corrosion of ferrous metals. prevention of corrosion in the atmosphere and under water; prevention of corrosion in closed water systems, in high-pressure steam plants and hot water systems; chemical corrosion; the prevention of corrosion underground; stray current electrolysis; and a classified list of selected references on the corrosion of ferrous metals.

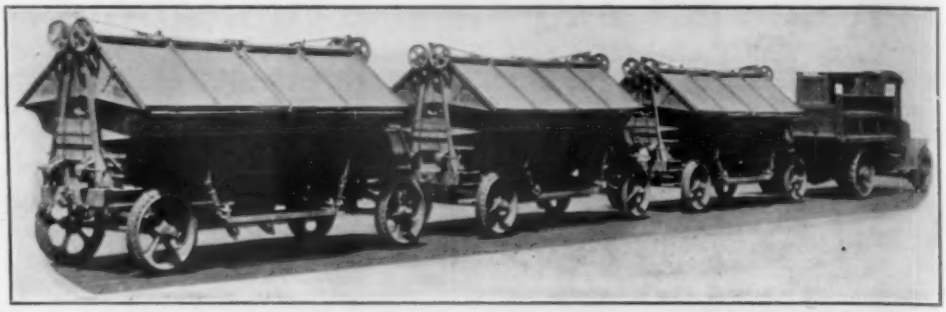
The Municipal Year Book for 1926.—Founder and Director, Sir Robert Donald, G.B.E., LL.D.; Editor, C. F. Bulpitt; Introduction by the Rt. Hon. Neville Chamberlain, M.P.; Minister of Health. Published by The Municipal Journal, Limited, Sardinia House, Sardinia Street, London, W. C. 2, England. 1926. 896 pp. 15 shillings net.

This important work covers the whole subject of local administration in Great Britain, and the latest edition brings the various sections up to date. The powers and duties of the different classes of authorities are explained; information is given as to rates, arranged for comparison; the financial results of municipal undertakings for 1924-1925—water, gas, electricity, tramway, motor-bus, and railless service, as well as markets, slaughter-houses, baths, wash-houses, and libraries. The latest developments of refuse collection and disposal, street cleaning, and sewage disposal are also presented. Among the new features are: a summary of the Government's Rating and Valuation Act; a section showing how the Government departments come into connection with local administration; a section on local education. one on municipal parks and open spaces, and recreational facilities; and more usable information relative to post-war housing. Besides the lists of county councils and urban district councils, there is a comprehensive list of municipal and kindred societies, with the names and addresses of the chief officials. There is a specially compiled census of the motor vehicles in use in the various towns throughout the country.

Origin and Destination of New York's Vehicular Traffic.—Staff report to the Committee on a Regional Plan of New York and Its Environs, May 10, 1926. Setting forth some of the results of traffic counts taken in the New York Metropolitan District, which it is hoped will furnish basic data for decisions as to the desirability of certain physical improvements. "From the standpoint of traffic a straight line is not always the shortest distance between two points, because time is a very important element. Traffic may be guided and by-passed in such a direction and over such a route that by going a longer distance time may be saved and congestion in the central area may be relieved." 16 quarto pp. Illustrated. (Apply to the Committee, 130 East 22nd Street, New York.)

New Towns Versus Existing Cities.—By John Nolen. A 12-page reprint from April, 1926, issue of *City Planning*. Illustrated. The new communities that are coming into existence as satellite towns or as garden cities have wonderful opportunities to do the right thing in the right way. They should "express new standards and new ideals and be an attempt to meet in new ways the modern conditions of life and the peculiar opportunities that these conditions offer." (Apply to City Planning, 9 Park Street, Boston, Mass.)

Suggested Tests for Probation Officer.—16 quarto pp. in *Public Personnel Studies* for June, 1926. The tests given represent considerable experimenting by Oliver C. Short, Director of the Department of Employment and Registration of the State of Maryland, in selecting parole officers and social service workers. (Apply to the Bureau of Public Personnel Administration, 26 Jackson Place, Washington, D. C.)



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Graphical Presentation of Traffic Accident Records.—Prepared by Lew R. Palmer, Engineer of the Equitable Life Assurance Society of the United States, 393 Seventh Avenue, New York. These graphs are based on statistics presented at the Hoover Conference on Street and Highway Safety, Washington, D. C., March, 1926. 32 sheets. (Apply to Ernest Greenwood, Secretary, National Conference on Street and Highway Safety, Washington, D. C.)

Housing and Health.—By Herman N. Bundesen, M. D., Commissioner of Health, Chicago, Ill. In the April 13, 1926, issue of Chicago's Health, published weekly by the Chicago School of Sanitary Instruction, City Hall, Chicago. Showing how housing affects the well-being of individuals and their good citizenship, and emphasizing the need of Chicago for improved housing for the small wage-earner and the large family. (Apply to the publishers.)

Culvert Load Determination.—Report of the Roadway Committee of the American Railway Engineering Association on an investigation into the loads acting upon railway culverts of various types. 35 pp. Photographs, charts, tables. An authorized reprint from Bulletin 284, Vol. 27, 1926, of the A.R.E.A., for the Armco Culvert & Flume Manufacturers' Association, Middletown, Ohio, to which apply.

Tuberculosis Prevention.—The January-February, March, 1926, issue of The Commonwealth, published by the Massachusetts Department of Public Health, Boston, Mass. 20 pp. Containing a summary of the first year's work of the State's Ten-Year Program for the prevention of tuberculosis, with interesting discussion of the methods and procedure. (Apply to the Department.)

Tax Rates in Minnesota, 1926.—Compiled by Harvey Walker. Publication No. 8 of the League of Minnesota Municipalities. April, 1926. 63 pp. Tables. The facts presented have been taken largely from the abstracts of tax lists filed by the county auditors with the Minnesota Tax Commission and the State Auditor, and from the statements of assessed valuations of school districts filed by the county auditors with the State Department of Education. The abstracts consulted contained figures for taxes levied in October, 1925, for payment in 1926. $1.00. (Apply to the League, University of Minnesota Library, Minneapolis, Minn.)

Suggestions for Conducting Demonstration Elections by the Hare System of Proportional Representation (P. R. with the Single Transferable Vote).—The suggestions presented in this 16-page pamphlet are based on the experience of the secretaries of the P. R. League in some hundreds of elections. April, 1926. (Apply to the Proportional Representation League, 1417 Locust Street, Philadelphia, Pa.)

The Withdrawal of Water from Lake Michigan by the Sanitary District of Chicago, and the Consequent Lake Lowering Controversy.—By Morris Knowles, President, Morris Knowles, Inc., Pittsburgh, Pa. A paper read before the Engineers' Society of Western Pennsylvania, May 18, 1925, and reprinted from Volume 41 of the Proceedings. Published by the Society, William Penn Hotel, Pittsburgh, Pa. 40 pp. Illustrated. The author says: "Chicago today is in the same position as the railroads were a generation ago; not a friend, but many enemies. .....No more can be gained to anyone by destroying Chicago than was accomplished by nearly bankrupting railroads by harsh regulatory methods." (Apply to the Society.)

A Bucolic Attitude.—By Walter Prichard Eaton. Duffield & Company, New York. 1926. VII + 74 pp. $1.00.

This book has been written in reply to Charles Downing Lay's interesting defense of city life, "The Freedom of the City," a notice of which appeared on page 713 of the June issue of The American City. Mr. Eaton replies to Mr. Lay by telling why he himself chooses to live in a Berkshire village, and what he is getting out of his life that the city could not give him. The author concedes much that has been said in praise of New York, but maintains that those praises cannot truthfully be sung of many other cities. He writes of the joy of creating with his hands something that shall contribute to the peace and beauty and dignity of a real home; of the happiness of getting acquainted with nature in all its seasons; of the friendliness and culture of certain of the villages that are statistically labeled "country." The man who cannot bring to the country community the character to feel satisfaction in creative activities, whose imagination finds no solace in books, who has no joy in sympathetic neighborliness, is courteously consigned to an apartment in the Times Building.

Dug, Drilled and Driven Wells.—Location and Construction for a Safe Water.—By Carl D. Gross, Supervisor of Rural Sanitation, and Harry F. Ferguson, Chief Sanitary Engineer, of the Division of Sanitary Engineering, Illinois Department of Public Health. Educational Health Circular No. 14. 8 pp. Diagrams. Valuable instruction for securing proper well construction that will avoid both underground and surface contamination. (Apply to Isaac D. Rawlings, M.D., Director of the Department, Springfield, Ill.)

Public Water-Supply of Indianapolis—Its Purification and Distribution.—A well-illustrated pamphlet of 16 quarto pp. describing the sources of this supply, its purification and distribution, and the equipment of the water-works. A tabular summary of general information regarding the system, as of April 10, 1926, is given; also some pertinent statements about the advantages of metering a water-supply. Twenty-seven members of the organization of the Indianapolis Water Company have devoted an average of 31 years' service to the system. (Apply to Frank C. Jordan, Secretary of the company.)

The Swimming Pool and Its Sanitation.—By Jack J. Hinman, Jr., Associate Professor of Sanitation, University of Iowa, and Chief, Water Laboratory Division, State Hygienic Laboratories. The October-November-December, 1925, issue of the Iowa Health Bulletin, issued by the Iowa State Department of Health, Des Moines. 32 pp. Illustrated. A full and interesting discussion of the construction and administration of swimming pools from the point of view of health. (Apply to the Bulletin.)

Swimming Pageants.—By Mary A. Brownell, of the University of Wisconsin. Four pamphlets. Series I, for outdoor production: The Treasure of Youth's Happiness; The Naiad; Indian Pageant. Series II, for outdoor and indoor production: A Night in Arabia; The Princess Elaine's Tournament. The Frog Prince. Series III, pageants and stunts: The Frog's Victory; The Sea Prince; Stunts. Series IV, for outdoor production: The Pageant of the Waters; The Choosing of Antaeus; Narcissus. Each 16 pp. Arranged for loose-leaf use. Published by A. S. Barnes and Company, New York. Each 75 cents. (Apply to the publishers.)

Frozen Funds.—The Story of the Community Trust. Published by The New York Community Trust, 120 Broadway, New York. A talk by Ralph Hayes, Director of The New York Community Trust, before The Association of the Bar of the City of New York. Handy size. 24 pp. Containing also comments on the community trust idea, which seeks to preserve from futility the funds of charitable trusts. (Apply to The New York Community Trust.)

Stockton, Calif., as a Factory Location.—A report issued by the Department of Industry of the Stockton Chamber of Commerce to familarize manufacturers in general with some of Stockton's characteristics which make the city a good location for many different kinds of factories. 57 mimeographed pp. (Apply to the Department.)

Vital Consideration Relating to Terminable Permits and Proposed Illinois Legislation.—By Francis X. Busch, Corporation Counsel, and C. Morton Doty, Assistant Corporation Counsel, of Chicago. 112 pp. The authors have endeavored to set forth frankly the advantages and disadvantages of indefinite franchises, to state accurately the general statutory environment in those states having such franchise laws, and to give without argument the constitutional and statutory limitations in Illinois that must be recognized in proposing such legislation for that state. (Apply to Municipal Reference Library, 1005 City Hall, Chicago, Ill.)

The Council-Manager Form of Government in Virginia.—A survey conducted by the League of Virginia Municipalities. In the May, 1926, issue of the *Virginia Municipal Review.* Covering the story of the birth of the plan at Staunton, Va., in 1908; the growth of the idea; the essentials of the plan as found in Virginia; and how the change to the manager plan is effected in municipalities of over 50,000 population and of less than 50,000. The results of the plan in the 24 municipalities of Virginia in which it is in force are given. (Apply to the League of Virginia Municipalities, 505 Travelers Building, Richmond, Va.)

Compensation Schedule of All Positions in the Service of the City of Oakland, Including Elective, Appointive, and Classified Positions, as of April 30, 1926.—In a report of the Civil Service Board of Oakland, Calif. 12 pp. (Apply to Charles C. DeWolf, Secretary of the Board.)

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A Purchasing System for Municipalities.—By Lloyd Morey, C.P.A., Statistician, "Illinois Municipal Review." 3 pp. in the Review for March-April, 1926, this being the second of a series of articles by Professor Morey on accounting and business procedure for municipalities. The procedure of central purchasing is here outlined, and requisition and purchase blank forms are given. 25 cents. (Apply to the Illinois Municipal League, Urbana, Ill.)

Parks in the Larger Cities of the United States.—Statistics compiled by Caroline L. B. Segrist, Librarian of the Portland, (Ore.) Municipal Reference Library. In the New York Municipal Reference Library "Notes" for April 7, 1926. 3 pp. of tables, giving many important facts as to the extent, cost, lighting, maintenance, and administration of parks in 66 cities. (Apply to Rebecca B. Rankin, Librarian, Municipal Reference Library, New York.)

Compression Tests on Brick Masonry.—A compilation of data covering 708 individual tests of brick masonry in the form of piers and walls. Prepared by the Building Code Committee of the United States Department of Commerce. March, 1926. Mimeographed tables, with introduction. (Apply to the Committee, Washington, D. C.)

Proper Methods of Constructing Asphalt Tennis Courts.—By W. E. Rosengarten, Engineer, The Asphalt Association, 441 Lexington Avenue, New York. 5 mimeographed pp. This gives in detail practical directions for making these courts, from constructing drainage and subgrade to finishing the surface, and tells the quantities of materials for the kinds of courts described. (Apply to the Association.)

The Ability of the States to Support Education.—By John K. Norton, Ph.D., Director of Research, The National Education Association. Published by the Association, Washington, D. C. 1926. VII + 88 pp. Charts. 50 cents.

In this study the economic resources of the states are first compared: wealth and income are considered separately as measures of economic power, also in comparison, and in combination. The educational obligations of the state are then measured in relation to various sections of population and also to the number of children aged 6 to 13. The comparative ability of the states to support education is presented and sumarized. Some accompaniments of the difference in the ability of the states to support education are stated, such as the financial support given, the educational efficiency, the school results, and the effort made to support education; and the permanency of the differences in ability is considered. Population, density of population, and cost of living are studied in their relation to the ability of the states to support schools. A bibliography is included.

The Twenty-Fifth Yearbook of the National Society for the Study of Education—Part I.—The Present Status of Safety Education. Public School Publishing Company, Bloomington, Ill. 1926. XI + 410 pp. Illustrated. $1.75.

This book has been prepared by the Society's Committee on Safety Education and its associates, and has been edited by Guy Montrose Whipple, Secretary of the Society. It is stated to be the joint effort of a group of men mainly interested in the development of the public schools and a group of men mainly interested in the campaign for the prevention of accidents. It gives detailed accounts of methods of handling this subject in typical cities and of classroom work in various types and grades of schools. The material presented is exceedingly valuable and interesting in its analysis of the significance of the movement and of what is being done to train those who are to train others in safety, and also in its accounts of the actual lessons in the schools.

What Our City Councils Are Doing.—Brief lists of references to ordinances introduced in, or passed by, the city councils of large cities. Lists Nos. 14 and 15. December 1, 1925, and April 20, 1926. 3 mimeographed pp. each. (Apply to Municipal Reference Library, 1005 City Hall, Chicago, Ill.)

Physical Education in the Public Schools of Newark, N. J.—Two pamphlets. An Exhibition Handbook—Special Demonstrations Illustrating Features of the Work in Physical Education in the Newark Public Schools. assembled by Randall D. Warden, Director of Physical Education and Recreation, Newark, N. J., and given at the American Physical Education Association Convention, May 12-15, 1926; 80 pp.; $1.00. Marching Drills, arranged by John N. Richards, B.P.E.; punched at binding edge, for loose-leaf use; 30 pp.; $1.00 (Aply to the publishers, A. S. Barnes and Company, New York.)

Protecting Human Lives.—By John D. Hertz, Chairman of the Board of the Omnibus Corporation of America, the Yellow Cab Co. of Chicago, and the Yellow Truck and Coach Manufacturing Company. An address delivered to the National Conference on Street and Highway Safety, Washington, D. C., March 24, 1926. 18 pp. The following points are made: motor-car drivers should be made to prove their fitness; slower traffic will help; the individual must cooperate with the administration of the law; every public vehicle licensed to carry passengers should be made financially responsible; synchronized traffic lights have helped in Chicago: a motorage sense of responsibility is needed. (Apply to the author, care of Yellow Cab Co. of Chicago, Chicago, Ill.)

Engineering Foundation.—Report for the year ended February 11, 1926. Published April, 1926. The Foundation was established in 1914 by the American Societies of Civil, Mining, Mechanical, and Electrical Engineers "for the furtherance of research in science and engineering, or for the advancement in any other manner of the profession of engineering and the good of mankind." This report covers its activities for the eleventh year in research and in the administration of its funds. 105 pp. Charts, tables. (Apply to Engineering Foundation, Engineering Societies Building, 29 West 39th St., New York.)

The Post-War Expansion of State Expenditures.—By Clarence Heer. Published by the National Institute of Public Administration, 261 Broadway, New York. 1926. 123 pp. Charts. $1.50.

An analysis of the increase between 1917 and 1923 in the cost of state government in New York. The author has found that during the six years mentioned, New York State expenditures increased 118 per cent, and that 44 per cent of this increase of $71,000,000 was due to price inflation; 13 per cent to more extensive use of current revenues in financing capital outlays; 23 per cent to compulsory additions to the state's costs due to unusual conditions of the period, not under the Legislature's control; 20 per cent to new state services and improvement of existing ones. The total optional increase during these six years in terms of 1917 dollars was less than $15,000,000, while the estimated private income of the people of the state, in the same dollars, increased by over $700,000,000.

Foster-Home Care for Dependent Children.—Revised edition (submitted November 24, 1925) of the Children's Bureau report on this subject (No. 136). V + 289 pp. Consisting of 12 articles by representative people who are at work on the particular aspects of the problems which they discuss. A new section on Psychoclinical Guidance in Child Adoption is included, also a number of new bibliographical references, including several on adoption. The plan for the report was worked out by Emma O. Lundberg, Director of the Social-Service Division of the Bureau, and the list of references and the selections from reports for the appendix were prepared by Laura Hood, of the Division staff. 35 cents. (Apply to Government Printing Office, Washington, D. C.)

Electric Power.—Successor to the Fire Engine.—A radio talk by Arthur Williams, Vice-President—Commercial Relations, The New York Edison Company. 4 pp. This is a brief, yet impressive, description of the fire protection given to the city of New York by the two central pumping-stations which have taken the place of fire engines on Manhattan Island south of 34th Street. Though the system has been in operation more than 15 years, there has never been the slightest interruption of service. (Apply to the author, Irving Place and 15th Street, New York.)

Reports Received

BUFFALO, N. Y.—Annual Report, Children's Court, 1925.

CHICAGO, ILL.—Annual Report, Department of Weights and Measures, 1925.

HARRIS COUNTY, TEXAS.—Annual Statistical and Financial Report, 1925.

HAYS, KANS.—Annual Report, City Manager, 1925.

MASSACHUSETTS.—Annual Report, Trustees of Public Reservations, 1925.

SCHENECTADY, N. Y.—Annual Report, Bureau of Sewage Disposal, 1925.

SPRINGFIELD, MASS.—Annual Report, Health Department, 1925.

STAUNTON, VA.—Annual Report of the City, year ending March 31, 1926.

WESTERVILLE, OHIO.—Annual Report, City Manager, 1925.

WINNIPEG, MAN.—Annual Report, Hydro-Electric System, 1925.

PARADISE PLAYGROUNDS

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On the Calendar of Conventions

JULY 14-16.—SEATTLE, WASH.
American Society of Civil Engineers. Summer meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

JULY 19-22.—CHICAGO, ILL.
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Chief of Police, Wilmington, Del.

JULY 20-22.—KANSAS CITY, MO.
National Association of Comptrollers and Accounting Officers. Annual meeting. Secretary, Mark M. Foote, 501 City Hall, Chicago, Ill.

JULY 22-24.—LUBBOCK, TEXAS.
Texas Commercial Executives' Association. Annual conference-school. Secretary, Jelks F. Castellaw, Ennis, Texas.

JULY 26-28.—CHEYENNE, WYO.
Governors' Conference. Annual conference. Secretary, Cary A. Hardee, Live Oak, Fla.

AUGUST 3-5.—LONDON, ONT.
Union of Canadian Municipalities. Annual meeting. Secretary, S. Baker, City Clerk, London, Ont.

AUGUST 16-20.—YOSEMITE VALLEY, CALIF.
California Conference on City Planning. Annual convention. Secretary-Treasurer, Charles H. Cheney, Palos Verdes, Redondo Beach, Calif.

AUGUST 16-20.—YOSEMITE VALLEY, CALIF.
League of California Municipalities. Annual convention. Executive Secretary, William J. Locke, 564 Market Street, San Francisco, Calif.

AUGUST 16-28.—EVANSTON, ILL.
National School for Commercial and Trade Executives. Address: John N. Van der Vries, 801 Otis Building, Chicago, Ill.

AUGUST 17-19.—CARROLL, IOWA.
League of Iowa Municipalities. Annual meeting. Secretary, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 24-26.—ERIE, PA.
Pennsylvania Chiefs of Police Association. Annual meeting. Secretary-Treasurer, J. N. Tillard, Chief of Police, Altoona, Pa.

AUGUST 25-27.—HALIFAX, N. S.
Union of Nova Scotia Municipalities. Annual convention. Secretary, Arthur Roberts, Bridgewater, Nova Scotia.

AUGUST 31-SEPTEMBER 2.—HAZELTON, PA.
Association of City Planning Commissions of Cities of the Third Class in Pennsylvania. Fall convention. Address: Department of Internal Affairs, Bureau of Municipalities, Harrisburg, Pa.

AUGUST 31-SEPTEMBER 2.—HAZELTON, PA.
League of Cities of the Third Class in Pennsylvania. Annual convention. Secretary, Fred H. Gates, City Clerk, Wilkes-Barre, Pa.

SEPTEMBER 1-3.—TORONTO, ONT.
Ontario Municipal Association. Annual convention. Secretary, Horace L. Brittain, 21 King Street East, Toronto, Ont.

SEPTEMBER 2-3.—DARLINGTON, S. C.
South Carolina Commercial Secretaries Association. Annual meeting. Secretary, George T. Barnes, Greenwood, S. C.

SEPTEMBER 6-13.—MILAN, ITALY.
International Road Congress. Secretary General, M. LeGavrian, Permanent International Association of Road Congresses, 1 Avenue d'Iena, Paris, France.

SEPTEMBER 7-10.—SPRING LAKE, N. J.
Illuminating Engineering Society. Annual convention. General Secretary, L. H. Graves, 31 West 46th Street, New York.

SEPTEMBER 13-14.—VIENNA, AUSTRIA.
International Conference on Housing and Town Planning. Address: H. Chapman, Organizing Secretary, International Federation for Town and Country Planning and Garden Cities, 3 Gray's Inn Place, London, W. C. 1, England.

SEPTEMBER 14-17.—PROVIDENCE, R. I.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 20-23.—ATLANTIC CITY, N. J.
American Institute of Accountants. Annual convention. Secretary, A. P. Richardson, 135 Cedar Street, New York.

SEPTEMBER 21-23.—COLORADO SPRINGS, COLO.
International City Managers' Association. Annual convention. Secretary, John G. Stutz, Lawrence, Kans.

SEPTEMBER 21-24.—ASHEVILLE, N. C.
International Association of Municipal Electricians. Annual convention. Secretary, Erwin H. Benz, Municipal Building, West New York, N. J.

SEPTEMBER 28-29.—WINNIPEG, MAN.
Canadian Tax Conference of the Citizens' Research Institute of Canada. Annual conference. Director, Horace L. Brittain, 21 King Street East, Toronto, Canada.

SEPTEMBER 28-30.—PHILADELPHIA, PA.
Pennsylvania State Association of County Commissioners. Annual convention. Secretary, L. C. Norris, Clearfield, Pa.

SEPTEMBER 28-OCTOBER 1.—WASHINGTON, D. C.
American Society of Sanitary Engineering. Annual meeting. Secretary, James R. Walker, 105 Cummings Street, Boston, Mass.

OCTOBER 4-7.—WASHINGTON, D. C.
National Tuberculosis Association. Annual meeting. Executive Secretary, Frederick D. Hopkins, 370 Seventh Avenue, New York.

OCTOBER 4-8.—CLEVELAND, OHIO.
American Electric Railway Association. Annual convention and manufacturers exhibit. Executive Secretary, J. W. Welsh, 292 Madison Avenue, New York.

OCTOBER 4-9.—ATLANTIC CITY, N. J.; PHILADELPHIA, PA.
American Library Association. Annual conference. Executive Secretary, Carl H. Milam, 86 East Randolph Street, Chicago, Ill.

OCTOBER 5-6—FARMVILLE, VA.
League of Virginia Municipalities. Annual convention. Secretary, Morton L. Wallerstein, 408 Travelers Building, Richmond, Va.

OCTOBER 7-15.—SAN FRANCISCO, CALIF.
All-Western Road Show. Address: P. H. Curtis, Manager, Union League Building, Los Angeles, Calif.

OCTOBER 11.—MEMPHIS, TENN.
Association of American Cemetery Superintendents. Annual convention. Secretary, W. B. Jones, Highwood Cemetery, Pittsburgh, Pa.

OCTOBER 11-14.—BUFFALO, N. Y.
American Public Health Association. Annual meeting. Secretary, Homer N. Calver, 370 Seventh Avenue, New York.

OCTOBER 15-21.—PITTSBURGH, PA.
American Prison Association. Annual convention. General Secretary, E. R. Cass, 135 East 15th Street, New York.

OCTOBER 18-21.—NORFOLK, VA.
American Association of Port Authorities. Annual convention. Secretary, Tiley S. McChesney, Room 200, Court Building, New Orleans, La.

OCTOBER 18-22.—ATLANTIC CITY, N. J.
Playground and Recreation Association of America. Annual Recreation Congress. Secretary, H. S. Braucher, 315 Fourth Avenue, New York.

OCTOBER 19-22.—NEW ORLEANS, LA.
International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 22.—DAVENPORT, IOWA.
Iowa Association of Commercial Organization Secretaries. Annual meeting. Secretary, G. B. Eastburn, Marshalltown, Iowa.

OCTOBER 24-27.—PITTSBURGH, PA.
National Association of Commercial Organization Secretaries. Annual meeting. Secretary-Treasurer, Walter O. Lochner, Chamber of Commerce, Trenton, N. J.

OCTOBER 25-28.—HOUSTON, TEXAS.
American Institute of Park Executives. Annual convention. Executive Secretary, Will O. Doolittle, Box 432, Rockford, Ill.

OCTOBER 25-29.—DETROIT, MICH.
National Safety Council. Annual Safety Congress. Managing Director, W. H. Cameron, 168 North Michigan Avenue, Chicago, Ill.

NOVEMBER 8-10.—ST. LOUIS, MO.
National Municipal League. Annual convention. Secretary, H. W. Dodds, 261 Broadway, New York.

NOVEMBER 8-12.—WASHINGTON, D. C.
American Society for Municipal Improvements. Annual convention. Secretary, C. W. Sammelman, 3811 Olive Street, St. Louis, Mo.

JANUARY 10-14.—CHICAGO, ILL.
American Road Builders' Association. Annual convention and Road Show. Secretary, Ethel A. Birchland, 31 West 39th Street, New York.

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News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Street Lighting in Florida

Among the progressive towns in Florida which are replacing their old systems of street lighting with new equipment are Mt. Dora, Sanford, Cocoa, and Vero Beach.

In the business district of Mt. Dora 80 G. E. Novalux units, made by the General Electric Company, Schenectady, N. Y., mounted on 15-foot Union Metal Company standards, have been installed. These are equipped with 1,000-candlepower lamps and are spaced 100 feet apart on the side in staggered formation. On the main traffic arteries they are 200 feet apart and are equipped

ORNAMENTAL LIGHTING STANDARD AT COCOA, FLA.

with 600-candlepower lamps. Alabaster rippled globes are used on both the main street and the travel arteries. Each fixture has an auto-transformer to which current is supplied by means of a General Electric pole-type transformer.

Sanford is installing 370 ornamental Novalux units with alabaster rippled globes and rippled canopies. These, equipped with 250-candlepower lamps, will be mounted on standards 11 feet high made by the King Manufacturing Company, 230 S. Clark Street, Chicago, Ill. In the business districts the units will be 100 feet apart in opposite formation. In the residential section, they will be 200 feet and staggered. The new lighting equipment is to replace small bracket units with reflectors using 60-candlepower lamps.

Cocoa, a town of about 6,500, is obtaining 197 General Electric Novalux lanterns. On the business street these units will be equipped with 250-candlepower lamps and will be mounted on standards made by the Union Metal Manufacturing Company, Canton, Ohio. They will be 100 feet apart in opposite formation. On the main-travel thoroughfares the units will use 100-candlepower lamps and will be 200 feet apart.

Vero Beach is installing 227 Novalux units. These will be arranged 100 feet apart in the business district in opposite formation and will use 400-candlepower lamps. On the main arteries of travel, the units will be staggered, 200 feet apart with 250-candlepower lamps.

How to Use Sewer Pipe Compound to Insure Tight Joints

In the use of G-K compound for sewer joints, moderate care is necessary to insure the very best results. The G-K Sales Agency, Macungie, Pa., in its directions for using G-K compound, states that it should be melted in a heavy cast iron pot, using coal or wood as a fuel, and testing the compound until it flows as freely as water from the ladle. A pouring vessel large enough to complete each joint at one pouring should be used.

After pouring the joint, the pouring vessel should be up-ended over the melting pot to allow the cool compound to drain out, and the compound should be stirred when melting to prevent carbonization.

Two ends may readily be poured on the bank standing on end, making it easy to calk in the jute and pour the joint without using a runner. Either dry jute or G-K gasket should be used, never tarred oakum. In the trench, when the pipe is at grade and butted, it should be calked and an asbestos runner moistened with puddled clay placed around the pipe at the bell, and clamped on top, leaving a V-shaped opening in which to pour. If there is an excess of water in the trench, a small sump can be made at the bell-hole after the runner is in place. Then two or three strokes of a small pump will lower the water below the invert for the minute needed for pouring the joint.

At times, because of very high heat under the heating pot, the compound may become frothy or turbulent and will not pour properly. When this condition occurs, a lump of raw compound should be placed in the heating pot and stirred slightly for a few minutes while the fire is checked. This will eliminate the frothy condition. The proper temperature to pour G-K compound is 350 to 400 degrees Fahrenheit, but, as it is difficult to read a thermometer correctly, a safe plan is to use a handled dipper and when the compound pours freely and smoothly from the dipper it is in proper condition to give results.

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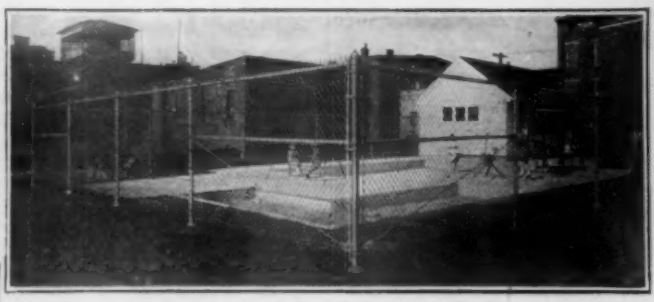

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Park and Playground Fence

The enclosure of recreation areas is a matter of importance. The fence must be suited to its purpose. *Wrought Iron Fence* is the logical choice for the school, or carefully tended city park. Its dignity compels respect and makes for orderliness.

For playground, athletic field and some park purposes *Chain Link Wire Fence* is often preferred for its practical economy. There is a choice of styles and heights, with and without barb-wire overhang. The chain link fabric is *galvanized after weaving*—and construction high grade throughout.

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The Traffic Signal Installation at Asbury Park, N. J.

HORNI TRAFFIC CONTROL UNIT WITH STREET LIGHT MOUNTED AT TOP

An interesting installation of Horni traffic control units is being made by the Eastern New Jersey Power Company of Allenhurst, N. J., under the supervision of George W. Michael and Paul P. Horni, the Vice-President and Chief Engineer of the Horni Signal Manufacturing Company, 183 Varick Street, New York. The system will consist of 112 lights located at the various intersections, all operated by a central control board at Police Headquarters, and will be distributed in six circuits, all of which can be controlled separately or as one unit or in any combination desired, as traffic conditions compel.

Traffic on any or all circuits can be changed in a simple way by turning a dial similar to the ordinary dial used in radio work, and the change of timing for traffic in any direction will not affect the length of time already given to the other directions or to the yellow lights which it is the intention of the officials to use for pedestrian traffic. No movement of vehicular traffic will be allowed on either red or yellow lights, except that turns may be made on the red lights as may be determined and as signs will so instruct drivers of vehicles.

A concrete example of the adaptability of Horni units is shown in the installation of lights on Ocean Avenue, which is actually the Ocean Drive at Asbury Park, paralleling the boardwalk and the beach. The present lighting arrangements for this avenue are a little out of the ordinary and produce an artistic setting, consisting of an ornamental concrete base on which is mounted a Continental Junior post with a Reflectolux, Jr., top, placed in the center of the Avenue. It is impossible from all points of view to add any poles or overhead wires to mar the beauty of this drive, and it was intended to clamp segmental traffic control units to the white-way standards. It was found, however, that by using the Horni straight sidewalk standards with an adapter for holding the white-way lanterns, a very efficient and artistic-appearing signal and standard could be obtained. A standard unit of this type was prepared, mounted, and operated as shown in the accompanying illustration and met with the approval of the officials in charge.

Ornstein Chlorination Patent Upheld

The U. S. Circuit Court of Appeals of the Second District on May 17 handed down a decision in the case of the Electro Bleaching Gas Company, New York, and Wallace & Tiernan Company, Inc., Newark, N. J., plaintiffs, vs. the Paradon Engineering Company, Long Island City, N. Y., sustaining the finding of the lower court and ruling that the Ornstein patent was valid and that the Paradon Engineering Company is guilty of contributory infringement.

A New Bullet-proof Motorcycle

A bandit-chasing armored motorcycle sidecar outfit designed by the Indian Motocycle Company, Springfield, Mass., is now undergoing tests in New York City. This outfit, at the suggestion of the New York City police, was designed and constructed to afford proper protection for motorcycle officers when chasing bandit cars. In all probability there will be a number of these outfits installed in the Department soon.

The bandit-chasing armored sidecar is equipped with two large shields of 1/16-inch bullet-proof metal, one located in front of the motorcycle driver and the other before the sidecar passenger. Each shield has a rectangular-shaped bullet-proof Cafetee glass inserted just above the center. This glass is 7/8-inch thick. In addition to the large shields there are two leg shields of the same metal, which complete the protection of the driver. The inside of the sidecar outfit is lined with this metal, so that any bandit bullets would only bound off harmlessly. The machine is an Indian Chief with Princess sidecar, equipped with balloon tires and the armor equipment adds only 40 pounds to its regular weight.

Heretofore when motorcycles have been chasing bandit cars, they have been entirely unprotected.

MOTORCYCLE WITH SIDECAR, BOTH PROTECTED BY BULLET-PROOF SHIELDS

Major Jennings Becomes General Manager

Robert W. Hunt & Company, Ltd., of Canada, has announced the appointment of Major Robert Bernard Jennings as General Manager with headquarters at 1001 McGill Building, Montreal. Major Jennings, of Canadian birth and education, has a fine record as a railway engineer of the Canadian Northern Ontario Railway and the Canadian National Railways. He is a member of the Engineering Institute of Canada and the American Railway Engineering Association.

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KING designs are created to satisfactorily meet every condition of environment. Our "Flemish Family" was chosen as most in harmony with the average Santa Ana type of architecture, the height and intensity of the lighting unit being determined by location in the various zones of the city.

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SANTA Ana is proud—and rightfully so—of her street lighting system. It is unquestionably one of the West's most modern and most complete systems.

Principal business streets, traffic arteries, boulevards and residential sections are all lighted with King Ferronite Standards of appropriate design, selected by the Board of Trustees and City Engineer after an exhaustive investigation to determine the relative merits of numerous types of street lighting equipment.

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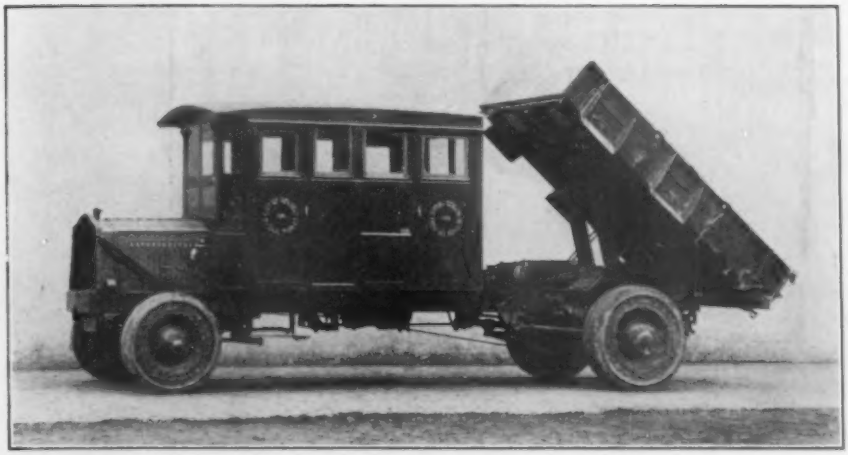


PLENTY OF ROOM IN THIS TRUCK FOR MEN, MATERIALS AND TOOLS

Emergency Street Repair Unit

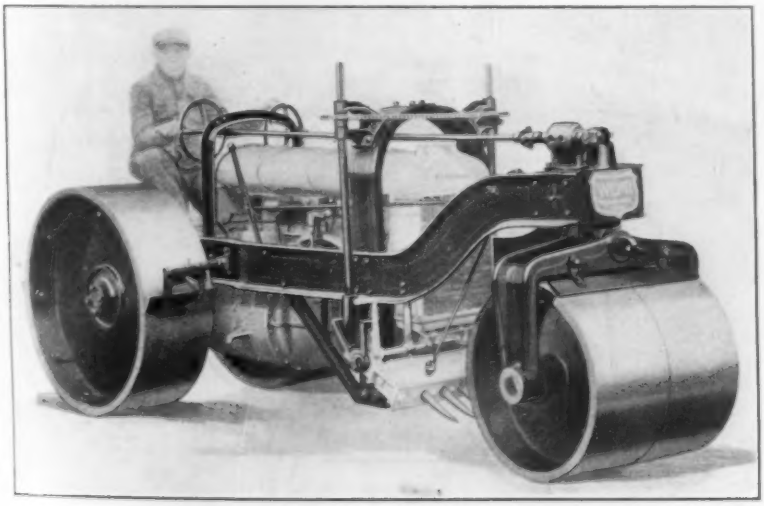
In most cities at least two trucks are employed to make emergency street paving repairs—one, a dump-truck containing the paving material, and the second to carry men and tools. The city of Detroit has found it economical to combine the entire equipment on one truck. This unit, as illustrated, is made by the Wood Hydraulic Hoist & Body Company, 7936 Riopelle Street, Detroit, Mich. It has an extra-long chassis to provide sufficient space in the cab for the men and tools, and a compartment in the dump body for extra tools, canvas covering, lanterns, etc. The men, tools, and material all arrive at the same time, and the work is quickly done.

Three Weights of Road Roller in One

By an ingenious arrangement of bolting heavy discs to wheels, the Wehr Company, Milwaukee, Wis., has produced a Fordson road roller which can be made a 3-, 4-, or 5-ton machine, as desired. Discs bolted to the rear wheels make it a 4-ton roller; to the front and rear wheels, a 5-ton machine. In addition to this variation in weight, the manufacturers have located the scarifier ahead of the center of gravity. Thus the pressure required to force the teeth into the ground and to keep them there does not lessen the traction by lifting up on the drive wheels. By pushing the lever at the right side of the tractor, the scarifier drops to working position. A hand wheel at the operator's left gages the depth of the teeth.

The frame of the Wehr-Fordson road roller is 8-inch channel steel, and a 3-inch diameter steel shaft is used in the front axle. The front wheels are mounted on four bronze bearings. The king-pin is a 2½-inch diameter steel shaft, and the cast steel pilot is mounted in heavy bronze bearings.

The steering worm is of steel with machine-cut teeth. The Wehr Fordson roller is 12 feet 4 inches long and 5 feet wide. The total height without a top is 5 feet 7 inches. It has a 9-foot wheelbase. The rear rolls are 42 inches in diameter and the front rolls 30 inches. The compression on the rear rolls per lineal inch on the 3-ton is 110 pounds, on the 4-ton 154¾ pounds, and on the 5-ton 207 pounds. On the front rolls the 3- and 4-ton are 95½ pounds, and the 5-ton, 115 pounds. There are seven teeth in the scarifier, 4½ inches between teeth, with a 7-inch ground clearance, when raised, and a 6-inch vertical adjustment of the teeth to take up wear.



NEW WEHR-FORDSON ADJUSTABLE WEIGHT ROAD ROLLER

Making Friends for EverWear

They Can't Break It!

PLAYGROUND EverWear APPARATUS

Out of Danger! Build Playgrounds! Save Lives! EverWear Stands Up

Save Lives—with EverWear

Year After Year!

There's No Danger of it's EverWear

Out of Danger! Playing on EverWear

The Great Teacher said, *"Suffer little children to come unto me."*

In all reverence may we say, Playgrounds will make the pathway easier.

Write for the beautiful, illustrated EverWear Catalog.

The EverWear Manufacturing Company

SPRINGFIELD, OHIO

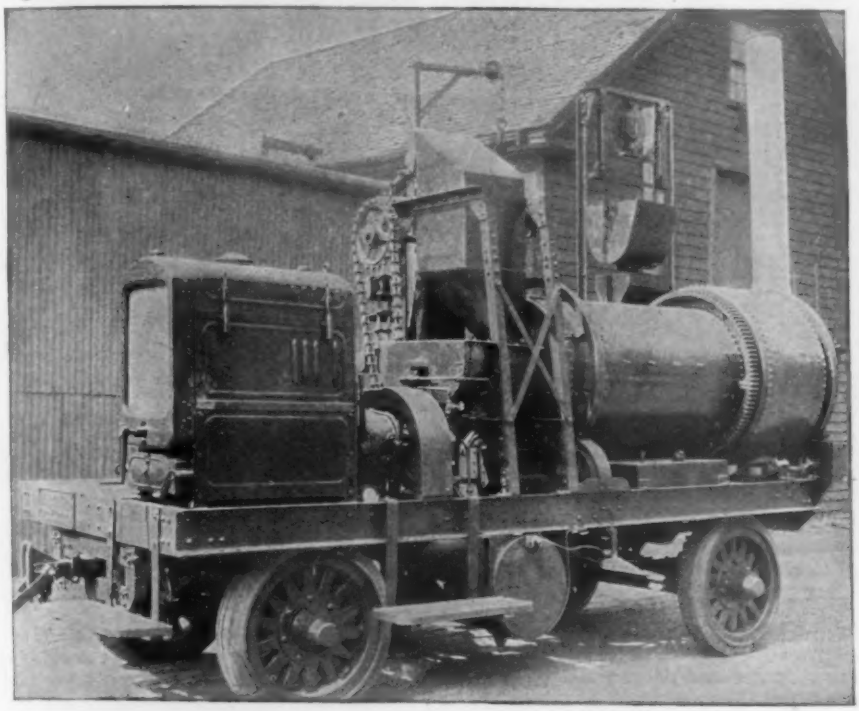
A New Utility Asphalt Plant

Warren Brothers Company, 38 Charles River Road, Cambridge, Mass., has brought out a new Utility asphalt plant with a capacity of 350 to 400 square yards of 2-inch pavement per day. The design of this plant makes it possible for a municipality to manufacture any type of mixed bituminous material. It can be alternately employed in the mixing of sheet asphalt, Topeka, mixed macadam, asphaltic concrete, or Warrenite Bitulithic without any change whatsoever in the mechanism of the plant.

The plant requires no wood, coal, or water in its operation. It is entirely self-contained, mounted in its entirety on one trailer, and can be dismantled for movement or erected for operation in from 15 to 30 minutes.

The drying and heating of the mineral aggregate and the melting and heating of the asphalt are done by means of fuel oil, compressed air being used to vaporize the oil at the burners. The 40-horsepower, 4-cylinder motor furnishes power to operate the plant, and a belt-driven, water-cooled air-compressor and air-pressure tank supplies the air to vaporize the fuel oil at the burners.

The over-all length of the plant is 16 feet, the width of the plant frame 7 feet, the wheelbase is 11 feet, and the approximate total weight of the plant 16,000 pounds. It will produce an 800-pound batch. The 18-gallon asphalt weighing kettle is equipped with 15-inch dial asphalt scales. The melting kettle has a capacity of 400 gallons.



THE NEW WARREN UTILITY ASPHALT PLANT MOUNTED ON A TRAILER

Temperature Regulation of Pool Water

The temperature of the water in any swimming pool should be maintained at 70 degrees Fahrenheit for comfort and enjoyment. In the past, outdoor pools have depended entirely on absorption of heat from the atmosphere, but the present trend is toward an independent source of heat to lengthen the period over which they can be comfortably used. With indoor pools, heating and maintenance of indoor temperature is very essential. The most satisfactory method of heating is the use of the live or exhaust steam heater. There is no difference in the number of heat units required and the consequent consumption of fuel, but what saving can be made is far more favorable to this method. The heater is usually installed in the system after the filters. This cuts down the loss in temperature, and the lower temperature required causes no precipitation of the temporary hardness.

The Graver instantaneous hot water heater made by the Graver Corporation, East Chicago, Ind., is a compact and efficient unit composed of a nest of U-shaped seamless copper tubing so arranged that a large amount of heating surface is contained in a small space. The shells of smaller sizes are boiler plate. Each heater is given a rigid hydrostatic test before shipment.

As illustrated, the cold water enters the bottom of the water chamber, passes back and forth through the tubes, practically instantly absorbing the heat from the surrounding steam and is discharged from the hot water outlet at the top.

A little journey through the GAMEWELL FACTORY

Inside the Stock Room Door

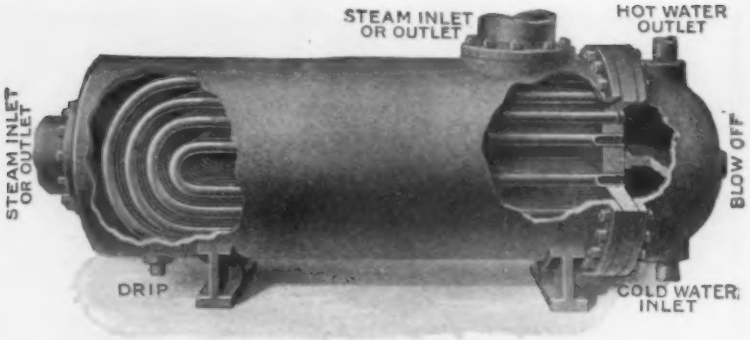
In its stock room this Company has a somewhat unique problem. Where the average automobile factory carries some 20,000 different parts in stock, the Gamewell Company must carry some 35,000. Fire and police systems give from twenty to fifty years' service. They seldom wear out but they do meet with accidents

Hundreds of Gamewell municipal and industrial systems are installed throughout the country. Thousands of different pieces of apparatus are in service in these systems and parts must be kept for most of them. Few concerns have such a stock problem on their hands.

Each new fire alarm system contains thousands of additional parts which the stock room must also handle. The equipment regularly carried in stock ranges from a semi-assembled police desk weighing a ton or more to platinum contacts which run a hundred or more to a pound; from rods of three-inch brass to a tenth-of-an-ampere fuse wire with a diameter of one-thousandth of an inch.

Careful supervision must be kept over this stock at all times. If too large quantities are purchased, there will be a tie-up of capital with its resultant loss. On the other hand, if too small a stock is maintained, production suffers and the emergency service, so essential in this business, is impaired.

THE GAMEWELL COMPANY
NEWTON UPPER FALLS, MASS.
"A Box a Block"



THE GRAVER HEATER, WHICH ADDS TO SWIMMING POOL ENJOYMENT

An automatic temperature-regulating valve is often furnished to be placed in the steam inlet, with the stem of the regulator inside the hot water outlet pipe. With this the desired temperature can be maintained without overheating or other steam loss.

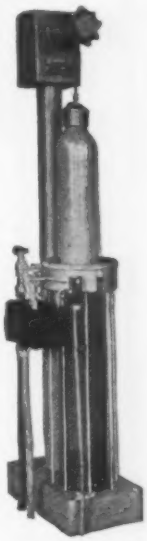
Playground Equipment for Fifty Children

Every youngster likes the merry-go-round idea, which is one of the reasons why the Merry-Whirl, made by the Mitchell Manufacturing Company, Milwaukee, Wis., has proved so popular with children. The Merry-Whirl is made from the best materials obtainable and requires only an area 30 feet square, while it accommodates 50 children without crowding.

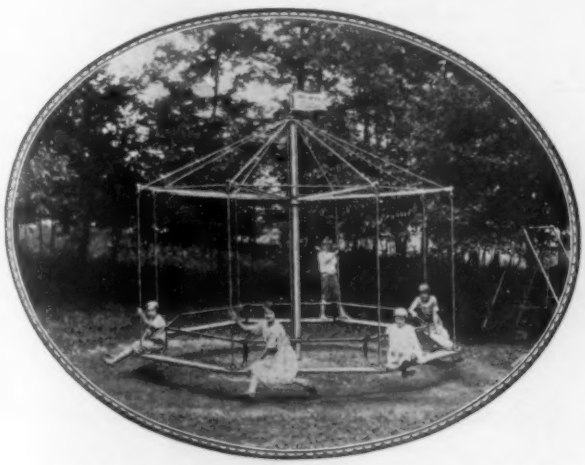
With this piece of equipment the desire of one child is not dominated by the will of other children, and even the tiniest of tots may board or leave the revolving seat at any time. Because of the well-built bearing members, the Merry-Whirl can easily be operated by one child. The platform or endless seat revolves around a staunch steel post, and can be simultaneously swayed to and from the mast. Because of its connection to the frame, the seat remains at all times parallel to the ground, and even though a child should fall from it, it would not be injured, since the seat would pass over the fallen youngster. An interesting piece of psychology regarding this piece of playground equipment is that it gathers children in a large group, thereby preventing any antagonism such as is liable to be created when a small number of individual seats are provided where large groups of children gather.

New Equipment for Feeding Small Quantities of Sterilizing Solutions

The W. & T. Chloro-Clock, made by Wallace & Tiernan Co., Inc., Newark, N. J., is an equipment for metering and feeding small quantities of sterilizing solutions. It operates on the displacement principle, the control being obtained from a clock-work mechanism which actuates an arm from which a displacing cylinder is suspended. The rate of feed of chlorine is adjusted by means of a pendulum mechanism and is arranged so that the contents of the cylinder container can be discharged at varying rates as required, from 20 hours to 8 days. A water-supply under pressure feeds the small constant-level box into which the solution drops. The same water-supply also operates an injector which applies the diluted sterlizing solution to the desired point of application.



THE W & T CHLORO-CLOCK



A PIECE OF PLAYGROUND EQUIPMENT THAT IS ENJOYED BY ALL

A Traffic Guide Five Inches High

The Elkhart traffic guide, which has been placed on the market as the result of considerable experience and development by the Elkhart Foundry and Machine Company, Elkhart, Ind., is the product of skilled workmanship and fine materials. The unit, which is fitted with eleven ruby glasses, is 17 inches in diameter and stands only 5 inches high. The traffic guide is equipped with a removable hand cover fastened in place with four large screws. This gives easy access to the lighting unit within the guide and strengthens it where bulk of metal is needed. The slope of the Elkhart traffic guide from the ground to the top is graded so that if a vehicle is driven over it, the shock does not damage the springs, but still provides a sufficient bump to make a driver more cautious the next time.

LYLE CARVED IN SIGNS

Would you like to have your municipal street signs on a **permanent** basis?

The answer lies in Lyle Carved-In Sign Construction.

In the Lyle Sign you will find **permanent,** rust-resisting sign plate of heavy (12 gauge) pure Armco Ingot Iron—purest of rolled irons, doubly protected by two-ounce galvanizing—**permanently** reinforced with a heavy rib or frame—letters **permanently** carved straight into the iron plate.

The Sign that Wears and WEARS and WEARS!

THE LYLE CULVERT & ROAD EQUIPMENT COMPANY

MINNEAPOLIS, MINNESOTA

See the Lyle catalog before making your selection.

REMAKING A ROUGH ROAD WITH WEHR GRADERS, IN GREENFIELD, IND.

A Grader Demonstration with a Historical Background

Directly in front of the birthplace of James Whitcomb Riley on Riley Avenue, Greenfield, Ind., a demonstration was recently made of a Wehr one-man power grader and scarifier, made by the Wehr Company, Milwaukee, Wis., for the benefit of a group of local officials. This section of street, on Riley Avenue between Main Street and the railroad, is known to be one of the roughest in the city. The Wehr grader shown in the illustration has been in use by the city of Greenfield since 1922 and is said to be still giving very satisfactory service. This old model, together with the latest type machine, scarified and graded two blocks of hard-packed, almost cement-like gravel streets in one hour and 35 minutes. The machine broke up the old gravel clear out to the ditches; the loosened material was then graded and leveled into a good street. An 18-inch layer of gravel in the center of the street made little or no additional gravel necessary to put the street in good condition.

A New Curb and Gutter Ditcher

A new curb and gutter ditcher for excavating for curb and gutter forms has been developed by the Barber-Greene Company, 515 West Park Avenue, Aurora, Ill. This machine will cut a trench 32 inches wide and 3 feet 6 inches deep at an average rate of 5 feet per minute. It has the same specifications as the standard Barber-Greene 44-B ditcher, except that it has a special curb and gutter boom with two bucket lines mounted in parallel. One bucket line cuts 21½ inches, and the other 10½ inches.

The manufacturers state that in addition to being a profitable machine for curb and gutter work, since it is able to average 150 feet an hour through tough digging and often makes runs of 2,500 feet per day, it is believed that the machine will prove worth while for uncovering old pipe lines.

Yeomans' Agents in Florida

Yeoman Brothers Co., 1417 Dayton Street, Chicago, Ill., has recently appointed the General Equipment Company, Lafayette Arcade Bldg., Tampa, Fla., as its sales representatives for central and southern Florida, handling the complete line of Yeomans centrifugal sewage ejectors, bilge pumps, sewage pumps, condensation pumps and centrifugal pumps for all purposes as well as the Shone pneumatic sewage ejector.

NEW BARBER-GREENE DITCHER IN ACTION

TRAFFIC CONTROL

——*at the least possible cost!*

Time was when one officer handled the traffic at any busy corner. Today, unless mechanical control is employed, it takes from two to four men to handle the same corner.

In our 12 types of traffic control devices there is something that will meet your particular need. And you will agree with us that it is the finest and most diversified line in the market. Automatics, both overhead and standard type, intersection signals, beacons, boulevard stops—you will find them all here. And if you have an engineering problem we gladly offer our services in case we can be of help.

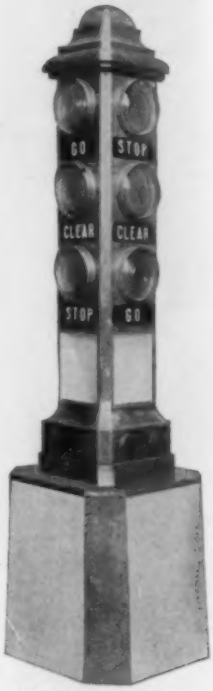


Illustration shows ou 6 DeLuxe Automatic. Entirely covered with copper. Sturdy and reliable control device.

Illustration shows assembly of sign, holder and standard. Also made in arm suspension type for clamping to trolley or lamp post.

Our Signals Embrace
Illumination — Visibility
Stability—Durability
Economy — Art.

In all fairness to your citizens and to strangers in your city, parking rules and restrictions should be posted where they may easily be read.

Our parking and zoning signs will do this for you at minimum cost. Dignified embossed signs in attractive enameled colors, together with our patented holders, enable you to spread your message. With our equipment there can be no excuse on the part of the driver.

The line includes parking and zoning equipment, directional signs, one-way street indicators, danger signs—everything to meet the needs of present traffic conditions. And the prices are so low that no municipality, large or small, can afford to build its own equipment.

New Catalog Ready—Write for Your Copy.

ROCHESTER STREET SIGNAL CO.

Designers and Builders of Traffic Control Devices

400 Ward Bldg. **Rochester, N. Y.**

THE NEW SARGENT SNOW LOADER, SHOWING CONVEYOR AND LOADING EQUIPMENT

A New Combined Snow-Plow and Elevating Loader

A new snow loader which is designed not only to load snow but to plow it, has been developed by Don A. Sargent of the Union Iron Works, Inc., Bangor, Me. This new snow-fighting machine provides a means of breaking up snow-banks which have been previously formed at the sides of a road and have become frozen before there was an opportunity to remove them. The equipment may also be operated directly following a snowfall.

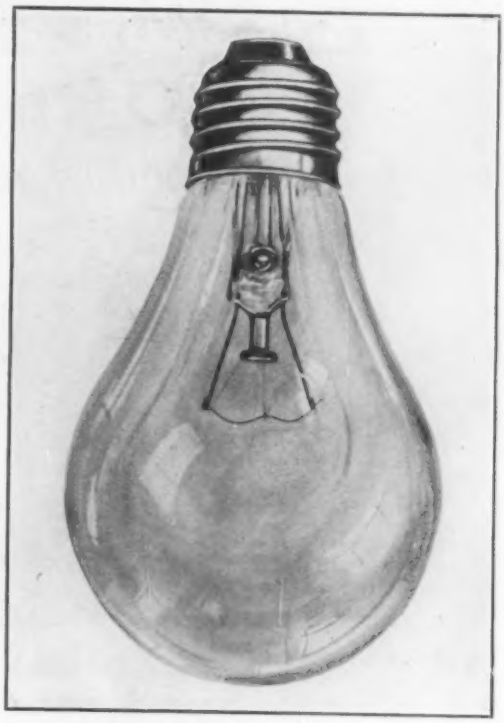
The elevating grader principle is applied to snow removal through this machine. The equipment has been in the process of development for about two years and has only now reached the desired point where it is being marketed for use next winter. The loader is built to operate with a 5-ton Caterpillar tractor, which is run between the side-frame members. The hitch is made under the draw-bar of the tractor at the rear. The conveyor itself is run by a separate power unit.

The rear end of the loader is carried on runners with 85 per cent of the weight at the forward end, carried on either wheels or runners. The plow or conveyor may be raised 10 inches from the ground, and means are also provided for raising and lowering the conveyor trough. Two men are required to operate the equipment—a tractor operator and a loader operator.

A New Mazda Lamp for Traffic Signals

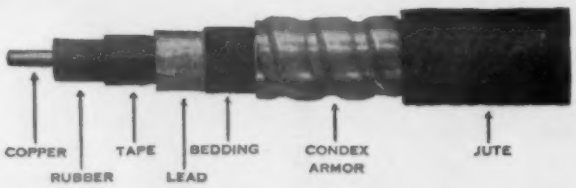
To keep traffic moving faster and more smoothly is the ever pressing need of our municipalities. A good traffic signal is in effect a giant officer that moves traffic faster and more smoothly than could a diminutive policeman. There are so many things the driver of the moving vehicle must watch, so much to distract his attention, that he should be guided by a signal which forces itself instantly upon his consciousness and compels action. Many light signals have been using lamps which were designed for other services. They are rugged lamps, but intended for use where efficiency and maintained brightness are not important factors. Experience has demonstrated that at times they are not as compelling as safety and maximum traffic movement demands, for a signal must be effective even against the brightest sky.

A new 60-watt Mazda-C lamp has been designed by the Engineering Department of the National Lamp Works of the General Electric Company, Nela Park, Cleveland, Ohio, especially for traffic



NEW MAZDA LAMP FOR TRAFFIC SIGNALS

CONDEX PARK CABLE



The flexible, locked steel conduit is a steel tape applied spirally around the lead-covered conductor. This steel armor and the unique way in which it is applied form the main distinguishing feature of CONDEX Park Cable. The steel completely covers the cable under all conditions and is securely locked together in such a way that there is little possibility of any portion of the cable ever becoming exposed to mechanical injury. The arch effect of the overlapping, interlocking steel gives unusual resistance to crushing.

The same careful workmanship goes into CONDEX Park Cable and the same high standard of quality is maintained that characterizes other well known Simplex products. It stands in the same class with FIBREX Tree Wire and TIREX rubber-sheathed cords and cables.

SIMPLEX WIRE & CABLE Co

MANUFACTURERS

201 DEVONSHIRE ST., BOSTON

CHICAGO SAN FRANCISCO NEW YORK
CLEVELAND SAINT AUGUSTINE

EASY to see, and HARD to beat—for

Reliability and Durability

Write for our illustrated folder

Elkhart Foundry & Machine Co.

Elkhart, Indiana

The Lehman Traffic Guide

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

signals. It gives an average signal brightness 50 per cent greater than the obsolescent 50-watt mill-type lamp for an increase of only 20 per cent in wattage. The signal brightness with the new lamp is sufficient to command attention at all times. This lamp has an A-21 clear glass bulb, as the standard inside frosted lamps are not adapted to this special service. Both bulb and light center length are short so that the new lamp may not only be used in new signals, but also replace the lamps in existing installations without any change in the equipment. Since the semi-concentrated filament is not in the center of the bulb, but nearer to the base, false or phantom signals from the lamp bulb are eliminated.

Movakan System Demonstrated in Borough of Queens, New York City

The Movakan Company, 809 Traction Building, Indianapolis, Ind., demonstrated the features of the Movakan system of catch-basin cleaning for the speedy removal of sand and other débris, on June 14, in the Borough of Queens, New York City. Through the cooperation of Elmer W. Firth, Assistant Engineer, Bureau of Sewers, Borough of Queens, a Movakan catch-basin has been inserted in the gutter at a street corner near the Borough Hall. This system consists of a catch-basin 2 feet in diameter and from 6 to 7 feet deep, the depth being dependent upon various conditions, such as gas and water pipes. In the demonstration installation, a well-laid brick manhole was constructed sufficiently wide to permit the metal can, made of 10-gage Armco iron, to enter the manhole. In regular installations, after excavation is completed, concrete for the bottom is placed in the hole and finished by hand. Then a collapsible steel form is assembled on the street and lowered onto it, the forms being made of 10-gage steel in two complete circular parts.

The metal lining or bucket which remains within the basin and catches all sediment, has a hinged bottom, which opens downward after it is removed from the catch-basin by a derrick mounted on a motor truck. This permits the free dropping of any detritus from the bucket. The metal lining is made to a true circle 23½ inches in diameter at the top and tapering to 21 inches in diameter at the bottom, and is 36 inches in length. The purpose of the tapering sides is to prevent binding when the bucket is being pulled from the catch-basin. A pipe running through the bottom of the bucket and carried up above the flow line of the basin is inserted to prevent a vacuum under the bucket when it is being raised. A vacuum might be caused by a seal of sediment about the rim of the bucket, but this is obviated by the pipe.

The demonstration, which was made with a regular bucket loaded with heavy street dirt and sweepings, was entirely successful and was viewed by a large group of interested officials from the Borough Hall.

New Manufacturer of Traffic Signals, Markers and Signs

The American Safety Signal Corporation, 897 Frelinghuysen Avenue, Newark, N. J., has entered the traffic signal field with a personnel made up entirely of signal men of long experience in the design, manufacture and sale of traffic signals. Its plant comprises 10,000 square feet on one floor, with sufficient additional land to permit of expansion. The building is being extensively remodeled to meet its requirements, and machinery of the most modern type is being installed. The officers and directors of teh company are Eugene S. Mayer, President; Harry A. Moore, Vice-President; Thomas Gamon, Jr., Treaesurer; S. B. Dressler, Secretary; Directors, Charles Milbauer, Frederick C. Breienbach, C. H. Hershey, John Enstice, Stockton G. Barnett, and Charles Eisler.

DEMONSTRATING THE MOVAKAN SYSTEM IN THE BOROUGH OF QUEENS, N. Y.

At top, manhole cover flush with street at corner near curbing. Bottom left, can just being removed from manhole by derricks mounted on motor truck. Bottom right, can swung to dump-truck, preparatory to emptying by tripping bottom latch

Hazard
RUBBER INSULATED
WIRES & CABLES

Wherever possible all wires and cables should go underground for the sake of service and ultimate economy. If you cannot go underground the next best move is to put something good and lasting overhead.

HAZARD SPIRALWEAVE TREE WIRE

HAZARD SPIRALWEAVE FIRE ALARM CABLE

HAZARD Spiralweave Tree Wire and Cables are in use in practically every locality and giving satisfactory service.
Send for copy of I. A. M. E. specifications covering cables.

"Made for users who want the best."

HAZARD MANUFACTURING COMPANY
Wilkes-Barre, Penna.

New York Chicago Pittsburgh Denver Birmingham Philadelphia

Every Playground Needs One!

JUNGLEGYM Climbing Structure

How the children do fly to it — climbing to the top, turning on the bars, hanging and chinning — no end of fun on the old Junglegym.

Write for details and prices

A. G. Spalding & Bros
Playground Dept. Chicopee, Mass.

BUTLER IMPROVED STREET CANS

are sanitary, artistic and serviceable.
The refuse thrown into the Butler trash can is out of sight. Once in, it stays in until taken out.
Write for latest literature.

The Butler Mfg. Co.
St. Anthony Fall Sta.,
Minneapolis, Minn.

MAIN ST.

"IDEAL" STREET & TRAFFIC SIGNS

Will not chip or crack

are used in St. Louis and many other cities. Many thousand names in stock for immediate use. Attractive and durable. Write for prices and sample.

AUTO SIGN DISPLAY CO. OF MO.
1421 Locust St. St. Louis, Mo.